PTEMBER, 1957

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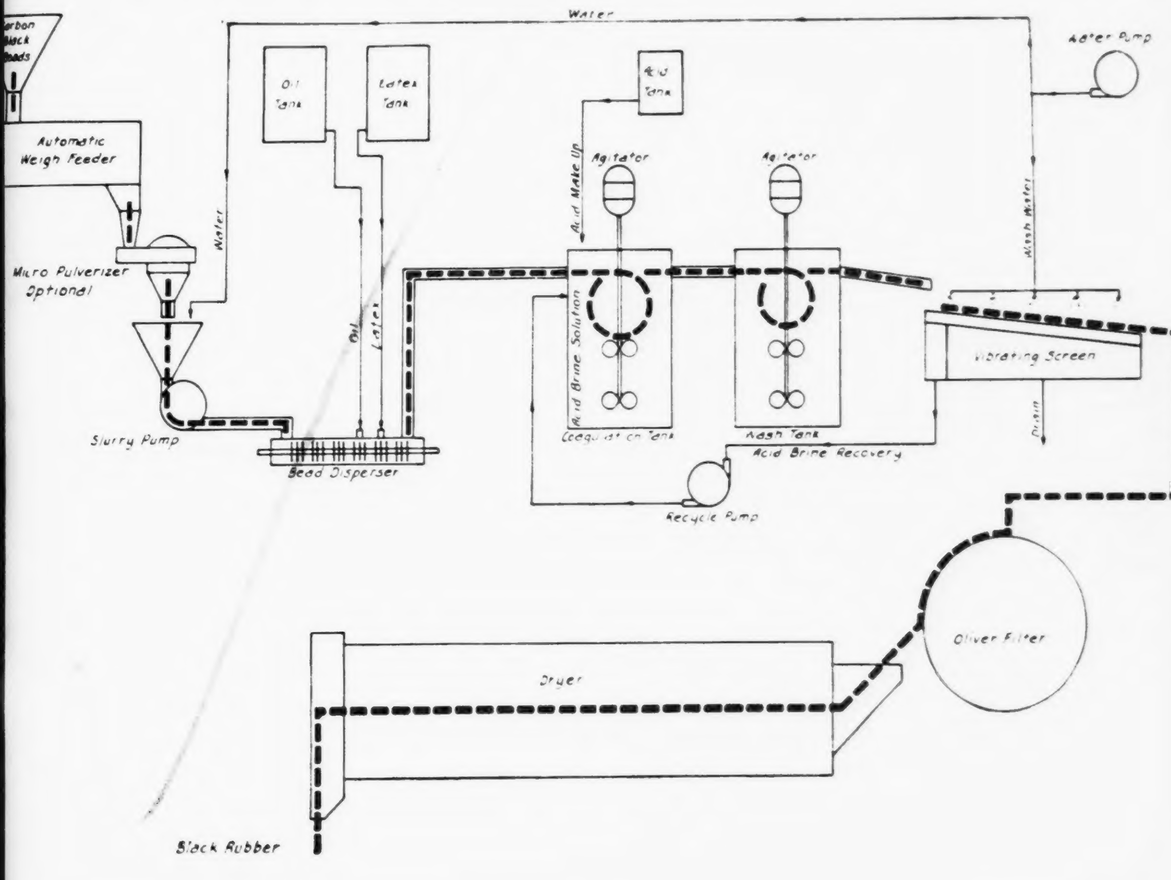

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IMPROVING THE CARBON-RUBBER BOND

By H. A. Braendle, page 835

RUBBER WORLD, September, 1957, Vol. 136, No. 6. Published monthly by BILL BROTHERS PUBLISHING CORP., Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States $5.00 per year; Canada $6.00. All other countries $7.00. Single Copies 50¢. Address Mail to N. Y. Office.

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SEPTEMBER, 1957
VOLUME 136, NUMBER 6

FEATURES

DEPARTMENTS

Cover Photo, Courtesy of Columbian Carbon Co.

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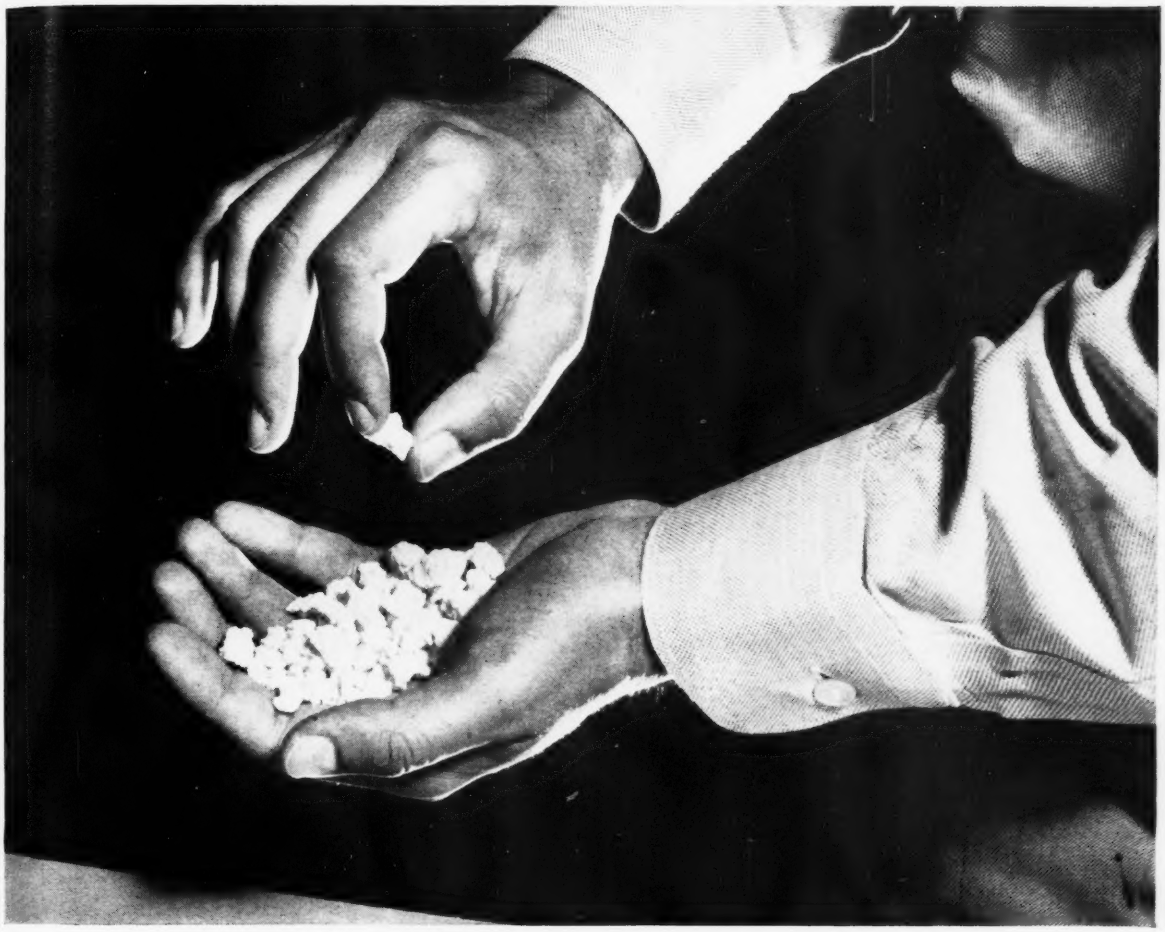

simplify processing and rubber addition

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NEW Good-rite 2057, in dustless, free-flowing "popcorn" form, is a ready-to-use, equally proportioned master batch of cold GR-S and Good-rite 2007 (RESIN 50). Its unique form permits processing as received.

It speeds weighing, handling and compounding—rapid "popcorn" breakdown shortens banbury and mill mixing cycles. Good-rite 2057 also ends the loss of separately-used reinforcing resin during handling and in worn equipment.

When Good-rite 2057 is compounded with GR-S, the vulcanizates exhibit a very complete range of physical properties, including: good hardness, low specific gravities, improved abrasion and flex characteristics, good tear and electrical properties.

Applications for Good-rite 2057 include shoe soles, floor tiling and hard extruded items. For further information on Good-rite 2057, write Dept. HN-9, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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Versatile White for Rubber

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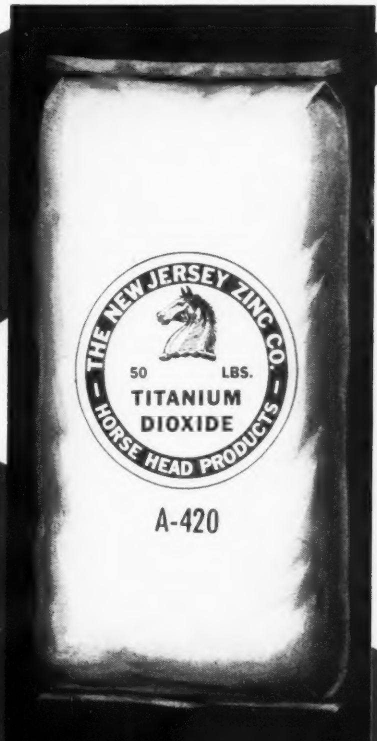
(anatase)



Try A-420 in any of your white or light-colored rubber products and you will find it most versatile. A-420 provides excellent results in a wide range of uses—from colorful drug sundries to white sidewalls that stay white.

A-420 provides excellent whitening power

A-420 incorporates and disperses easily in any elastomer

A-420 disperses readily in latex and, because of low salts content, does not interfere with stability

A-420 imparts excellent dynamic flex-crack resistance in white sidewalls

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Photo courtesy of the New Jersey Rubber Company, Taunton, Mass.

One thing all America is soled on

The first steps in the development of a synthetic shoe sole were taken in the early 1930's. It was introduced commercially shortly after World War II. Since that time, this lightweight, waterproof, long-wearing blend of synthetic rubber and resin has grown in acceptance to where it is now used on just about 65% of all shoes of all types produced in these United States. And its use is still spreading.

Constant improvement in both raw materials and compounding techniques has been the key to the success of these soles. It's also the reason why PLIOFLEX rubber and PLIOLITE S-6B, the reinforcing resin by Goodyear, are so widely used by sole manufacturers.

The main advantage of PLIOFLEX in shoe soles is its unusually light color and high uniformity. With PLIOLITE S-6B, the advantages lie in superior processability and reinforcing properties. And with both materials, there's unmatched technical assistance and service.

If you are looking for top-quality shoe soles or any rubber product where hardness, stiffness, or toughness properties are important, be sure you have the full story on PLIOFLEX and PLIOLITE S-6B. It's yours simply by writing Goodyear, Chemical Division, Dept. I-9418, Akron 16, Ohio.

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It Could Put Your Product in a New Light, Too

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Here is a development that may well put a product of yours in a completely new light or even inspire a totally new one. It's the substantial improvement made in the color of PLIOFLEX to give industry the best, complete line of nonstaining, non-discoloring rubbers currently available.

The true significance of this new, light color of PLIOFLEX lies not in a mere product improvement, but in the opportunities it offers for new and wider uses of synthetic rubber. Now, with PLIOFLEX, designers and manufacturers can combine the resilience, flexibility, elasticity and other desirable properties of a true elastomer with the delicate colors so much in demand—and do so at a reduced cost.

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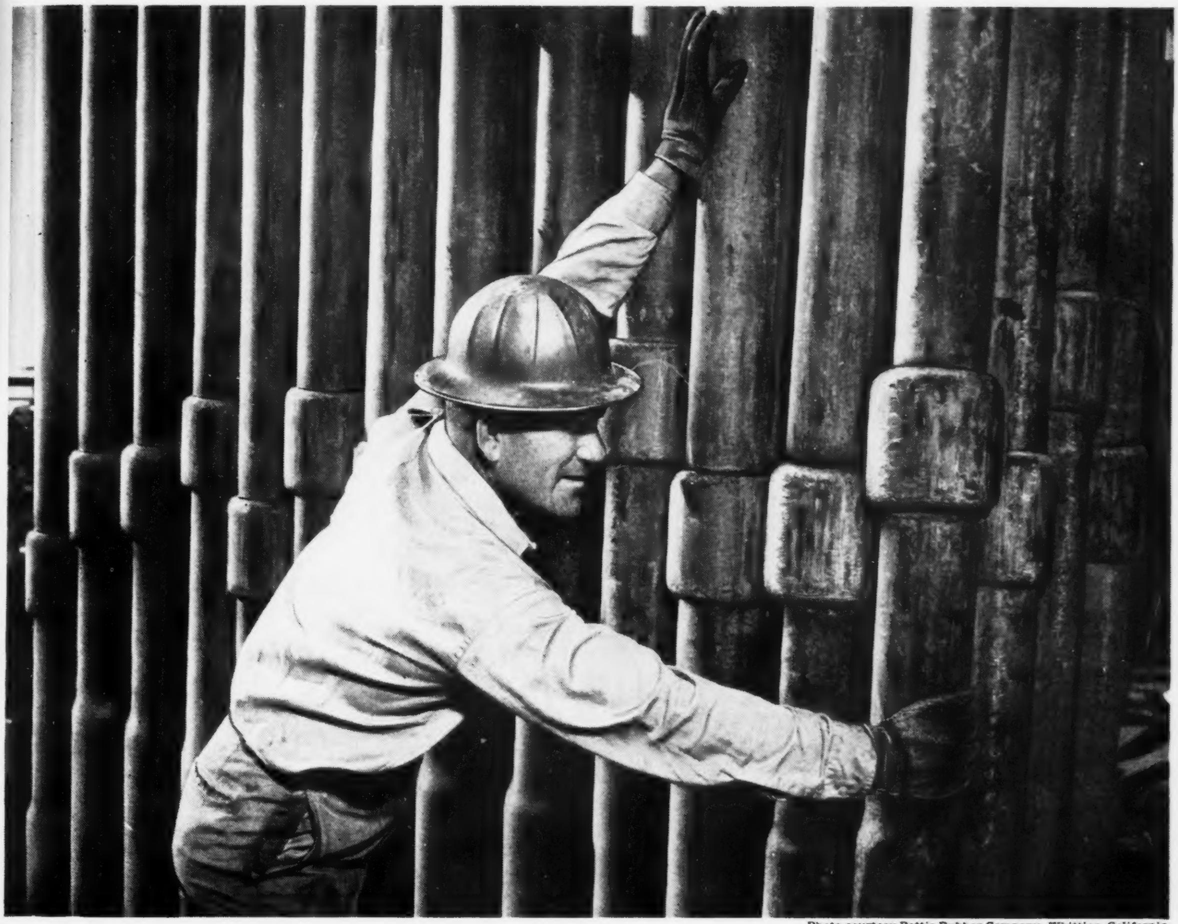

Photo courtesy Bettis Rubber Company, Whittier, California

TITANOX*. . . the "sole of whiteness"

She's a light-footed young lady, because the white rubber in her shoes is pigmented with TITANOX titanium dioxide white pigments.

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As A RESULT of Goodrich-Gulf research and development, hot polymer grades of Ameripol man-made rubber are now available in "crumb" form as well as in molded bales long familiar to all processors of rubber products.

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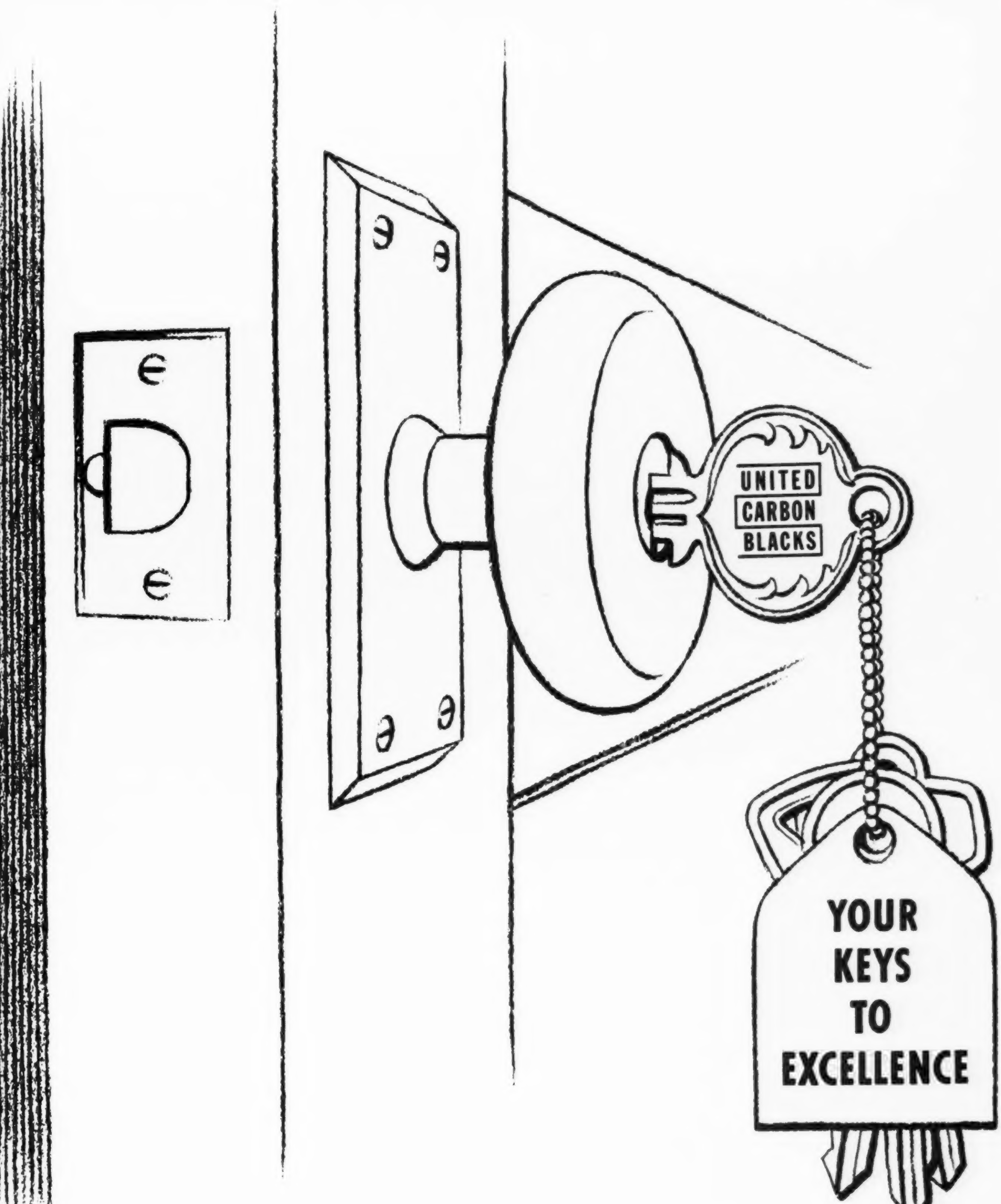
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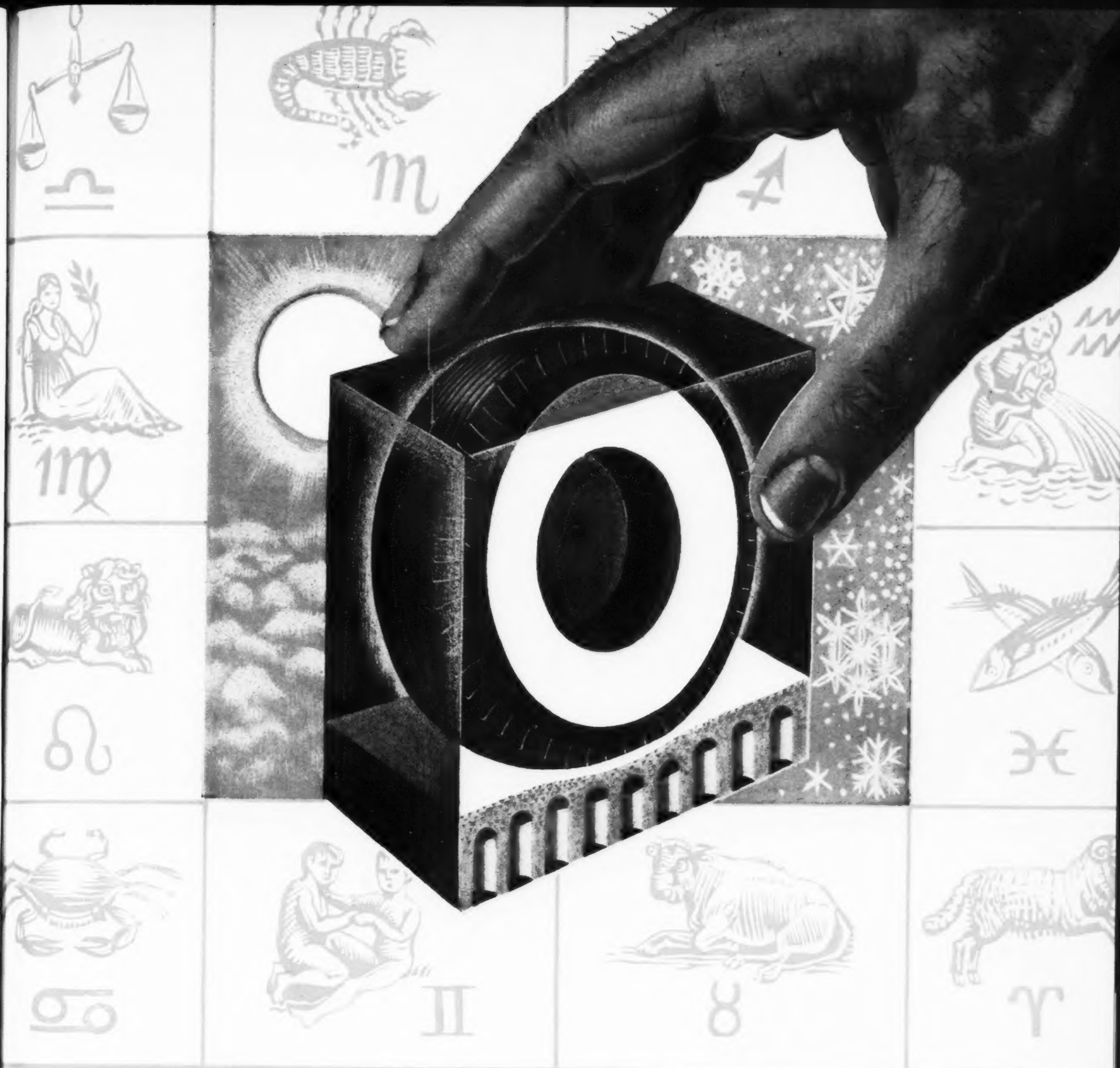

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DRY!...like a mummy

Every drop of moisture was extracted from this mummy long ago by the dryness of the Egyptian desert.

Naugapol® polymers, too, are *dry*—and stay dry—because they are made by a special process that eliminates moisture-absorbing salts.

To make its Naugapols moisture-free, Naugatuck uses acid to replace salt as the coagulant following polymerization. Extra straining and milling further remove water solubles. The result is a rubber espe cially suited for use in wire and cable insulatio and in mechanical rubber products requiring goo flexibility at sub-freezing temperatures.

This is but one of many ways in which Naugatuc and its extensive research and development facili ties can help you with specific needs. If you requir special grades or special properties in syntheti rubber, call on Naugatuck to supply them.

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Rubber Chemicals · Synthetic Rubber · Plastics · Agricultural Chemicals · Reclaimed Rubber · Latices · CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario · CABLE: Rubexport, N

it pours!

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- Greater ease of handling—*it pours*
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MODICOL N—A chemical stabilizer useful in compounds containing casein. Controls viscosity by minimizing undesirable thickening action. Especially stable to heat.

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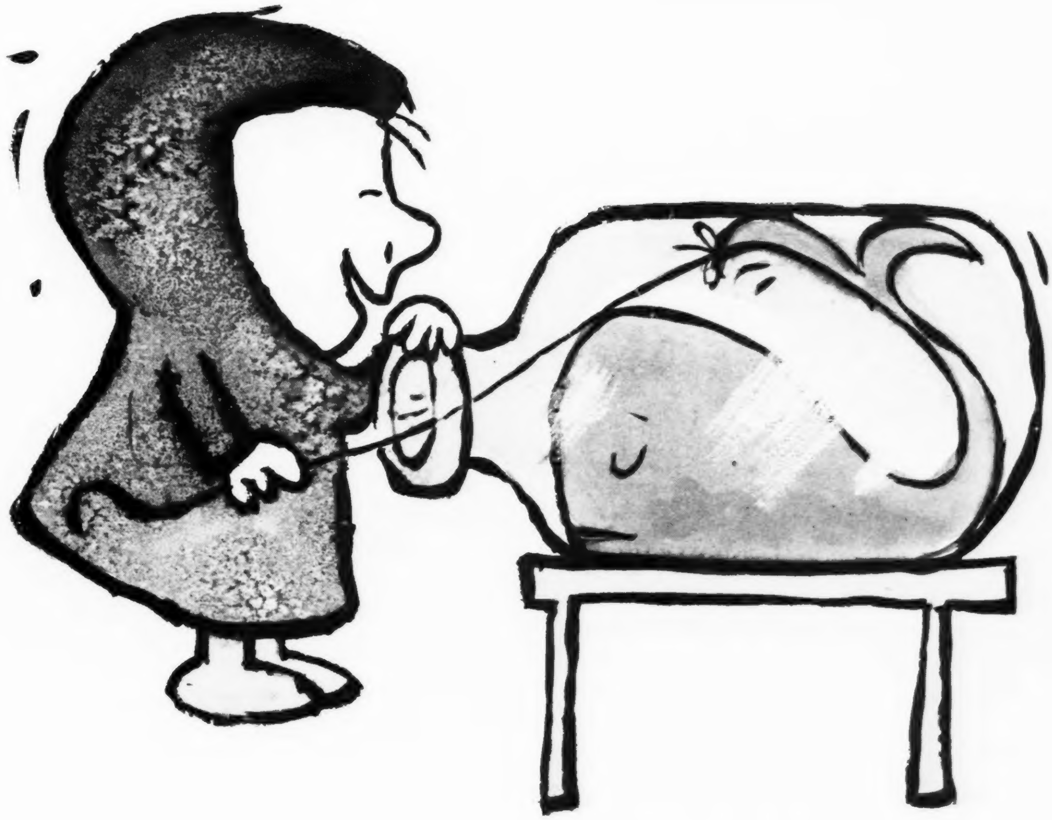

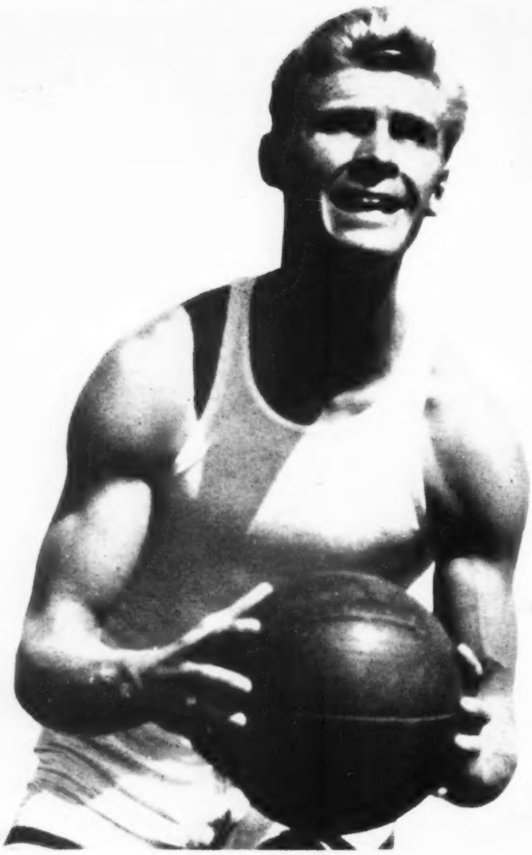

LOWER COST Now—and FROM NOW ON...

WITH

NRM

RUBBER EXTRUDERS

NRM
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When you "go shopping" for rubber extruders, check carefully into the NRM Line. And don't let the low first cost of NRM Extruders mislead you . . . It's difficult—at any price—to beat their superior design, construction and operating features, and well nigh impossible to match with *any* other machine, their long life of low maintenance, high profit operation. A few of the many features which have made NRM Extruders the "standard of the industry" are:

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  Creatively engineered for greatest workability in smallest floor space.
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  Independently cooled head and cylinder helps NRM Extruders deliver more stock *without* exceeding critical temperatures.
- **EXTREMELY VERSATILE**
  NRM sizes are from 1½" to 12", to meet a wide range of production requirements. NRM Die Heads for mechanical goods, tube, tread and slab extrusion are available.

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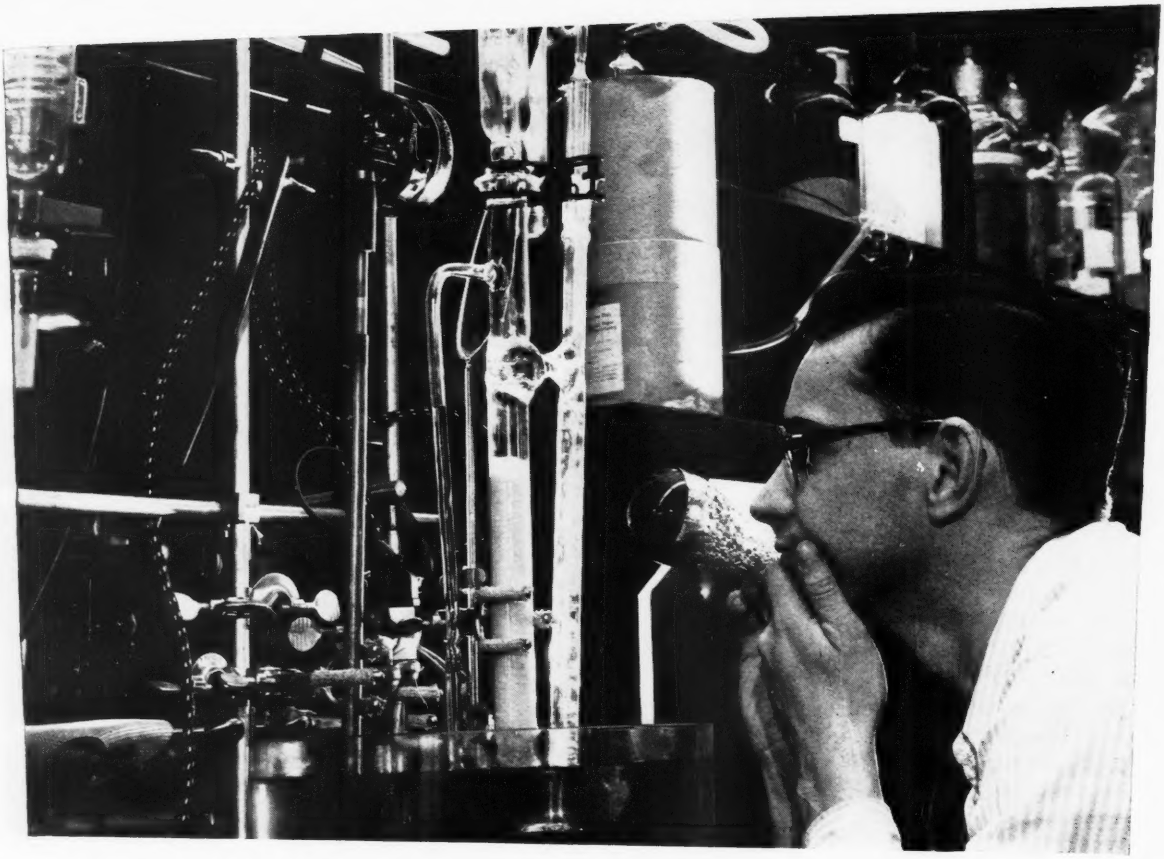
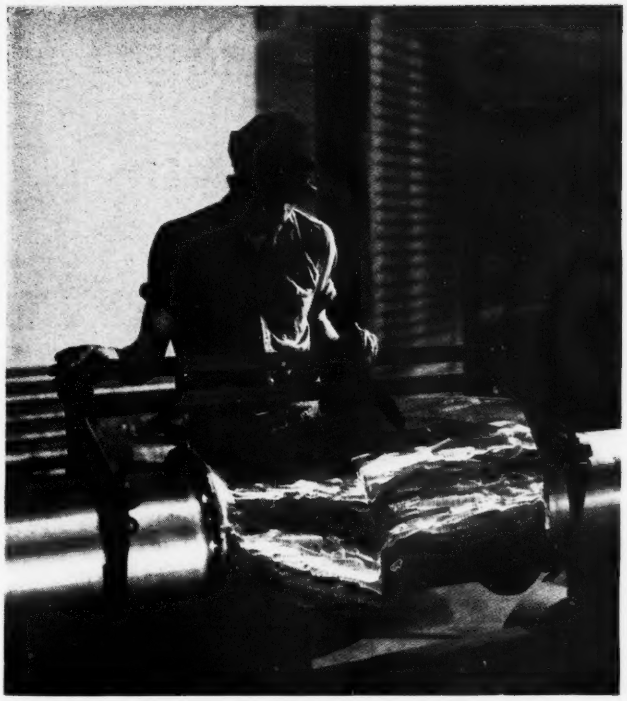
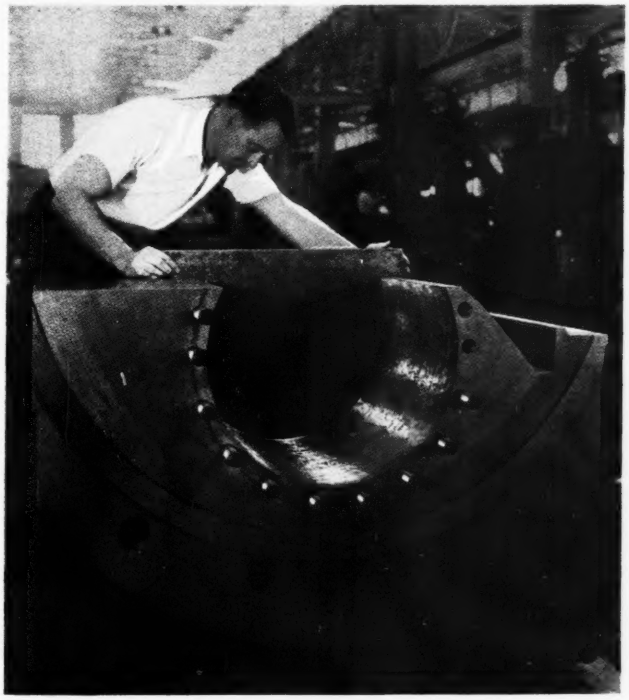
Creative Engineering





Above—Gauging the rough-ground body of a Banbury rotor.
Below—New liner in Banbury side gets a final gauging.



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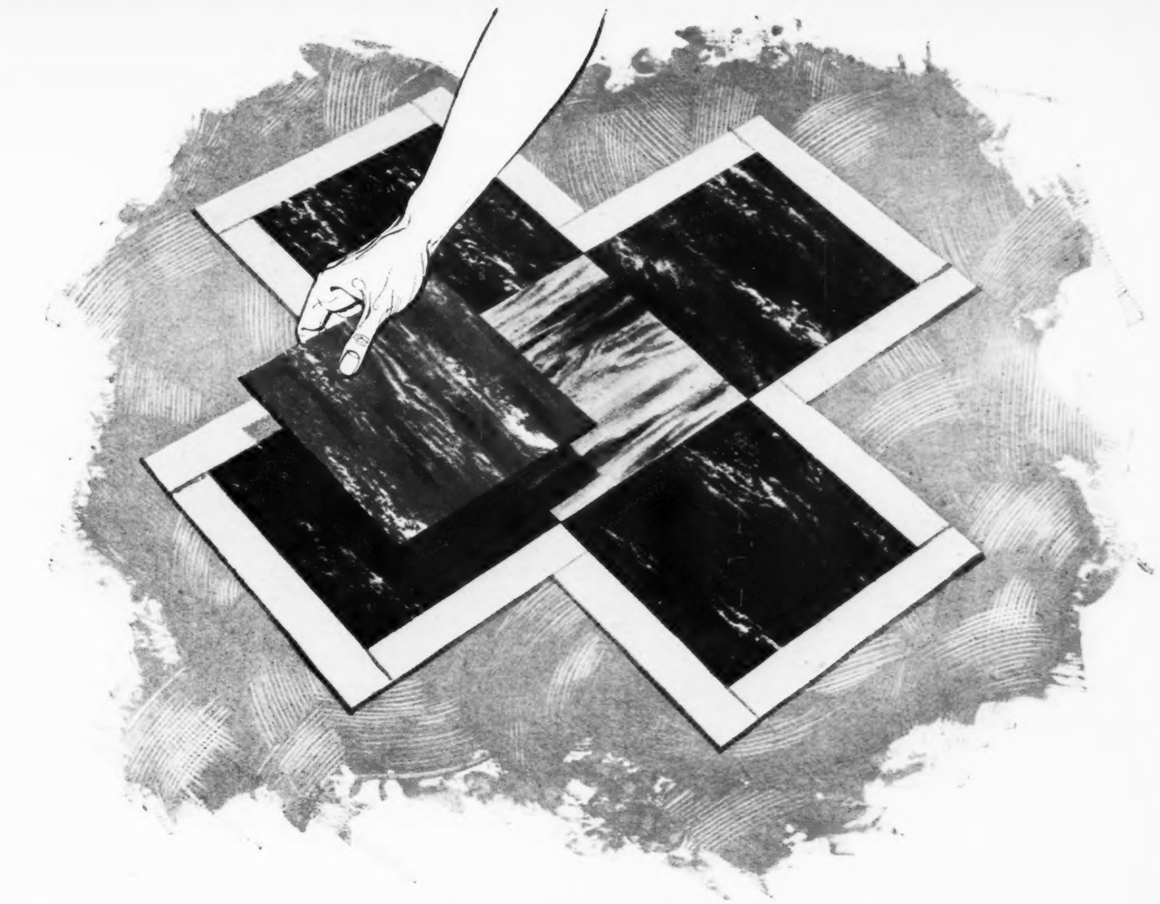
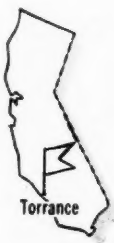


FLOOR TILE?

For top quality and sparkling color, too

. . . make it from

SHELL SYNTHETIC RUBBER



IF YOU WANT the tile you make to be the *best* . . . if you're looking for brighter colors and better color stability . . . use improved Shell S-1006 hot or S-1502 cold rubber.

Both are excellent for other products, too—light-colored mechanicals, sporting goods, shoe soles and heels.

The Shell Chemical plant at Torrance, California produces a full line of butadiene-styrene-type synthetic rubber to fill the needs of large and small Western manufacturers. Available types include hot, cold, oil-extended and black masterbatch rubber as well as hot and cold latices.

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Synthetic Rubber Sales Division
P. O. Box 216, Torrance, California

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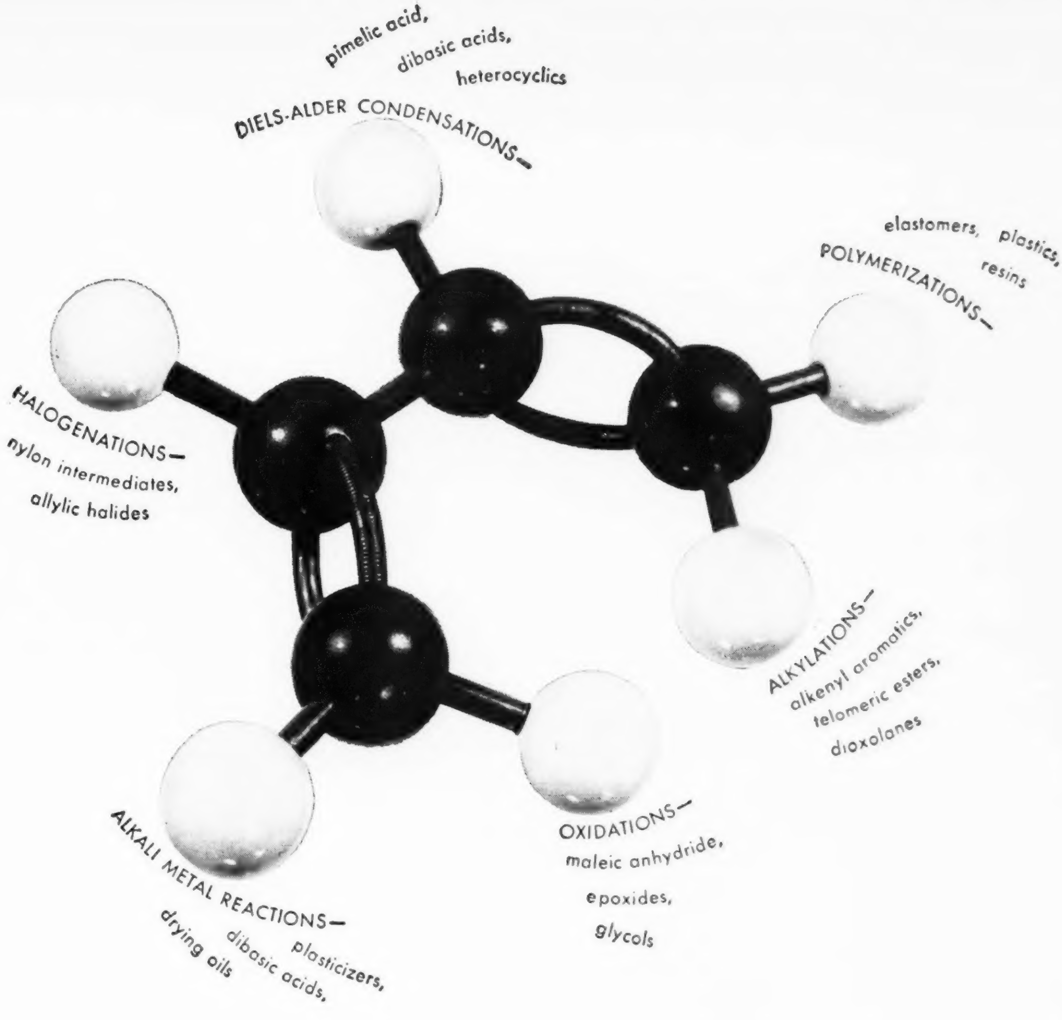

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Though already one of the few billion-pound chemicals, many new significant uses of Butadiene are yet to be realized; the structural opportunities offered by this four-carbon building block are limited only by man's creative imagination.

To further encourage the development and use of Butadiene, TEXUS production facilities have been greatly expanded, assuring the Chemical Industry of sufficient quantities for both current and growth needs.

In addition to providing a dependable source of supply from the world's largest Butadiene plant, TEXUS offers you the benefits accruing from important and expanding research and development programs.

Your inquiry regarding present and prospective uses of Butadiene is sincerely invited . . . and will be held in the strictest confidence. A letter or call to our New York office will bring you the current TEXUS Butadiene Technical Bulletin and also subsequent data as it is published.

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Color stability of TiO_2-loaded, Dutrex 33-extended SBR stocks after severe exposure to artificial sunlight.

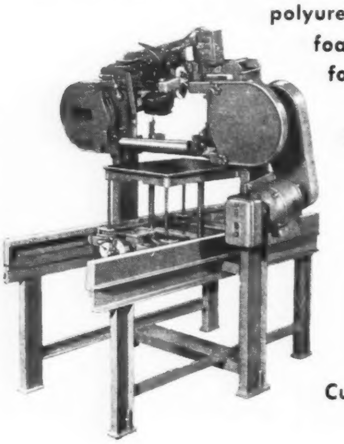
Sample designation—reading clockwise

1707—GRS-1707
Dutrex 33—SBR-37.5 phr Dutrex 33-extended iron pyrophosphate polymer
1502—SBR-1502
Dutrex 33—SBR-37.5 phr Dutrex 33-extended sulfoxylate polymer
1006—SBR-1006

FEMCO SPLITTERS from laboratory

1 LABORATORY SPLITTER

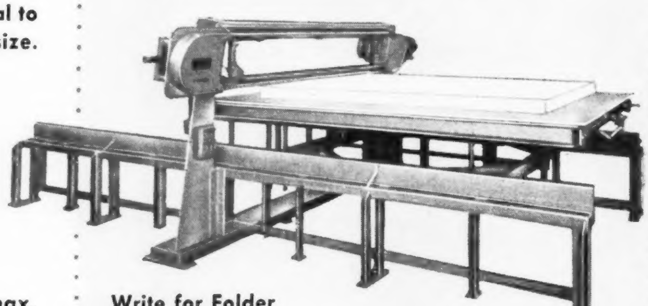
Identical (except in size) to Model 4410-430B (shown second right) but scaled down to table size 18″ x 24″ for laboratory splitting. Splits polyurethane, polyvinyl foam, polystyrene, foam rubber from stock equal to table size.



Cuts stock to max. 12″ thickness

2 LEVELER and SPLITTER

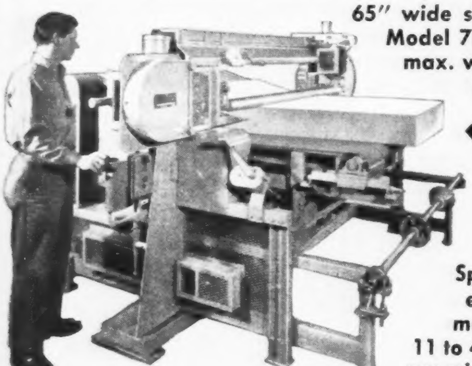
Model 4410-430A. Splits Foam Rubber to ⅛″ and handles stock to 84″ x 110″. Levels slabs to 12″ high, reduces to sheets of required thickness. Has interchangeable ribbon guide assembly for splitting cord foam rubber and for cutting angles and contoured shapes.



Write for Folder No. 3-25-57

5 Models 65 & 78 SPLITTERS

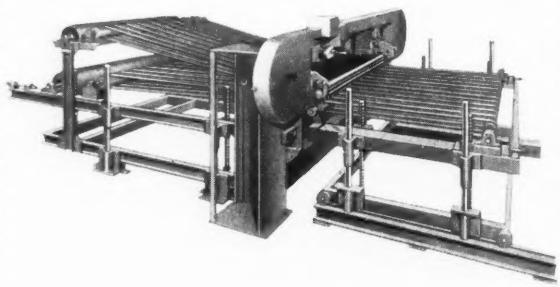
Splits all newest synthetic foams, foam rubber, rubberized hair, bonded foam, etc. Both models split leveled blocks of stock from rolls, sheets and slabs to sheets as thin as ⅛″ Both handle rolls to 40″ diameter. Model 65 handles max. 65″ wide stock; Model 78, to max. width 78″.

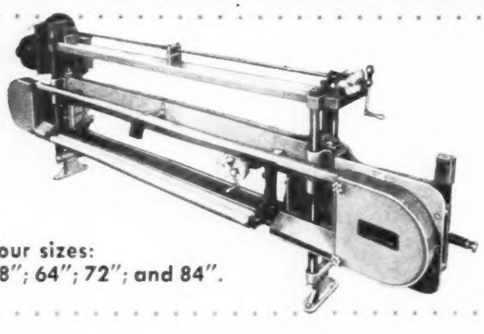


Speed, either model: 11 to 44 ft. per minute.

6 CONVOLUTION MACHINE

Levels like cushion cutter, splits like Models 65-78 Splitter, takes 9′ or longer slabs or rolls; has Convolution features which produce irregular or corrugated cuts on polyurethane and polyvinyl stock. Splits stock into sheets to ⅛″ with max. thickness of 15″.





Four sizes: 48″; 64″; 72″; and 84″.

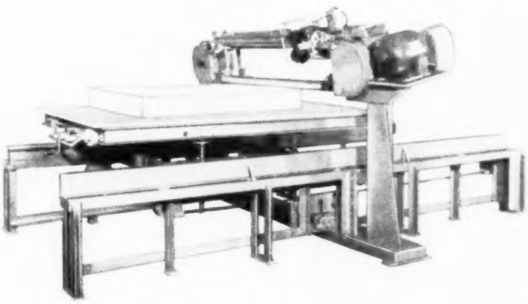
9 Adjustable SPLITTING HEAD

Installed on existing conveyor systems. Located across conveyor — vertically adjustable to stock moving along conveyor. Use it as single unit or install in a series along conveyor line. Splits polyurethane, polyvinyl, foam rubber, bonded foam, rubberized hair, cellulose sponge, resin bonded fiber, polystyrene and Fibreglas.

models to High Production Units . . . .

3 LEVELER and SPLITTER

Model 4410-430B, similar in most ways to Model 4410-430A (at left). Splits polyurethane, polyvinyl, polystyrene, styrofoam, and other rigid urethanes, to sheets 1/8". Handles stock to 84" x 110".



Write for Folder No. 3-25-57

4 Single Head Automatic Table Type LEVELER and SPLITTER

Automatic, requires only one (man OR woman) operator. Levels slabs of polyurethane, polyvinyl, other materials to 24" high and reduces to sheets 1/8" to 6" thick. Cuts some stocks to 1/16". Self-indexing, lowers head to cut stock, raises to clear material as table returns.

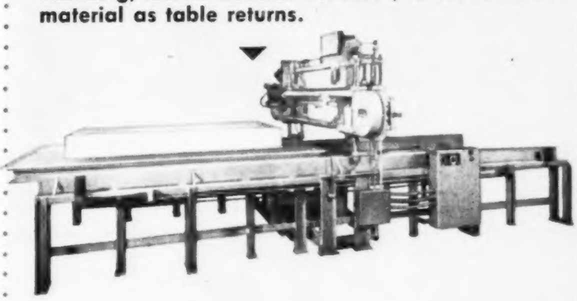
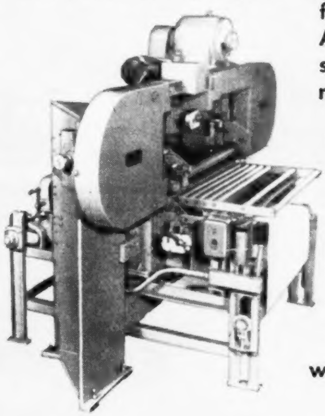


Table sizes: 45 x 64; 45 x 84; 64 x 84; 64 x 96; 64 x 110; 84 x 110; 84 x 162.

7 65" Heavy Duty SPLITTING MACHINE

For heavy factory use. Available with or without leveling device. Splits materials such as open and closed cell sponge rubber, closed cell vinyl foam to 65" wide. Available with roll stock windup or return conveyor belt for sheet stock. Cuts to 2" maximum thickness.



Equipped with 2" wide blade—driven by 15 hp motor.

8 Double Head Conveyorized SPLITTING MACHINE

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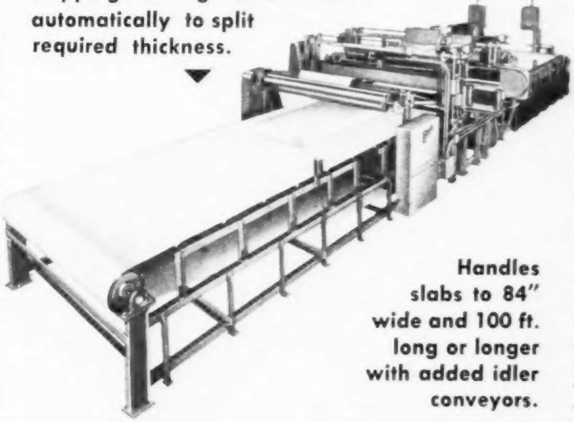

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SILICONE SQUAD
AGENT 36
HOW I SOLVED THE SCRAP CAPER
FROM THE OFFICIAL FILES OF DOW CORNING
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SCRAP! TOO MUCH SCRAP!
REJECT
PRESIDENT
5,000 DECIBELS... 6,000 DECIBELS... I'M AFRAID WE'LL GET THE BENDS!
1
REJECT
WE'VE GOT TO STOP THIS SCRAP! GET TOGETHER WITH RESEARCH AND BRAINSTORM!
DON'T TREAD ON ME
PRODUCTION MANAGER
2
DON'T BLAME THE RUBBER
DON'T BLAME THE MOLDS!
DON'T BLAME THE MEN!
3
BLAME SHMAME! THE BLOT IN THIS PLOT IS STU GOO. MY JOB: HOUND THE DOG DOWN!
AGENT 36
4


GOO, YOU'RE THROUGH. YOU'VE PULLED YOUR LAST STICK UP!
OPEN THE MOLD RICHARD!
BRRACK! YOU'LL NEVER GET ME GUM-SHOO!
5
NO, NO, PLEASE... NO, NOT DOW CORNING SILICONES... NO... OH NO!... ARGHH!
TAKE THAT! AND THAT!
6
NOW SCRUB HIS (UGH!) DIRTY REMAINS OUT OF THE MOLD.
7
THAT FINISHES STU GOO, AND YOUR SCRAP TROUBLES, TOO. YOUR MOLDS WILL NEVER GUNK UP WHEN THEY'RE LUBRICATED WITH DOW CORNING 36 EMULSION.
8
DOW CORNING 36 GIVES QUICK RELEASE, REDUCES SCRAP, IMPROVES SURFACE FINISH, STEPS UP PRODUCTION, CUTS MOLD MAINTENANCE, SAVES MONEY, MAKES EVERYBODY HAPPY!
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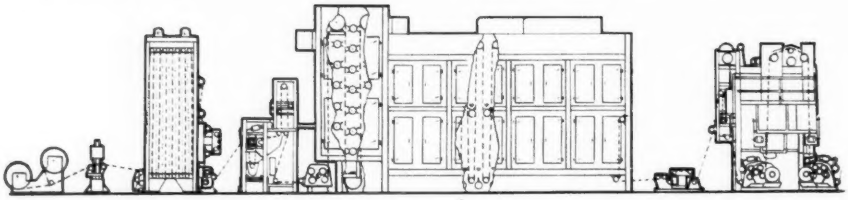

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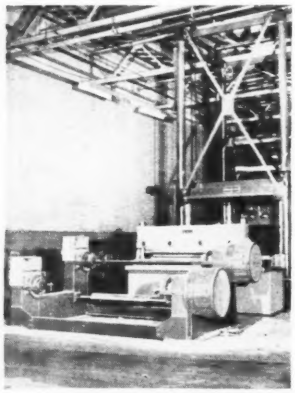

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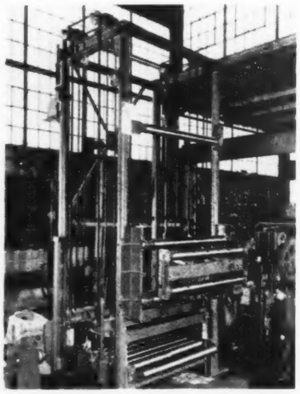

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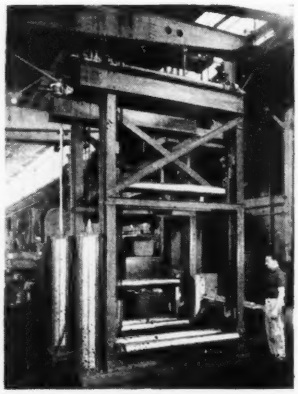
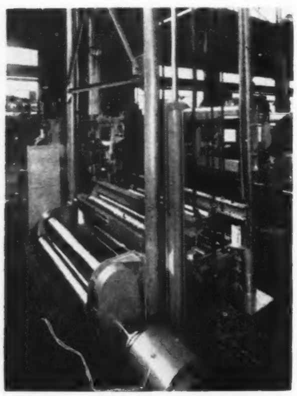


Compensators



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PRE-DIP EQUIPMENT:

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Latex Films Prior to Copper Staining

'Sharples' brand
MERAC®
Ultra Accelerator shows high resistance to copper staining in latex films . . .

Latex Films After Copper Staining

'Sharples' brand MERAC—a liquid ultra accelerator which upon dilution with water is added directly to latex—is well suited for use in both natural and synthetic formulations. Films compounded with MERAC show improved resistance to discoloration in the presence of copper, compared with ordinary dithiocarbamates.

Illustrations I and II show latex films before staining with copper. Compound I was accelerated with 1.5 PHR of zinc dibutyldithiocarbamate, and II was accelerated with 2.0 PHR of MERAC. Photos IC and IIC show the results of the copper staining.

In addition to giving a minimum of discoloration in the presence of copper, MERAC offers other important advantages:

- Faster curing than most accelerators at room or elevated curing temperatures.
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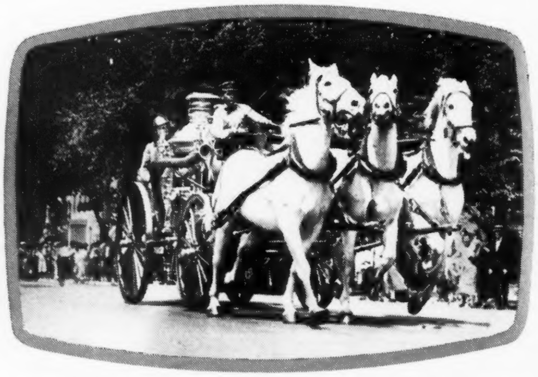

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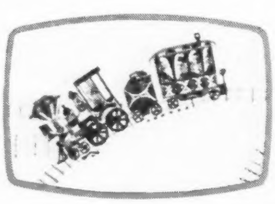

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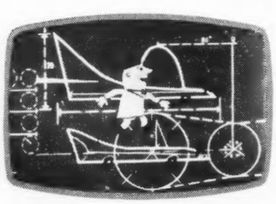

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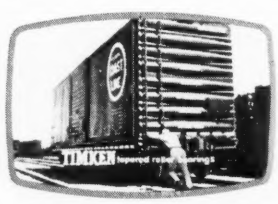

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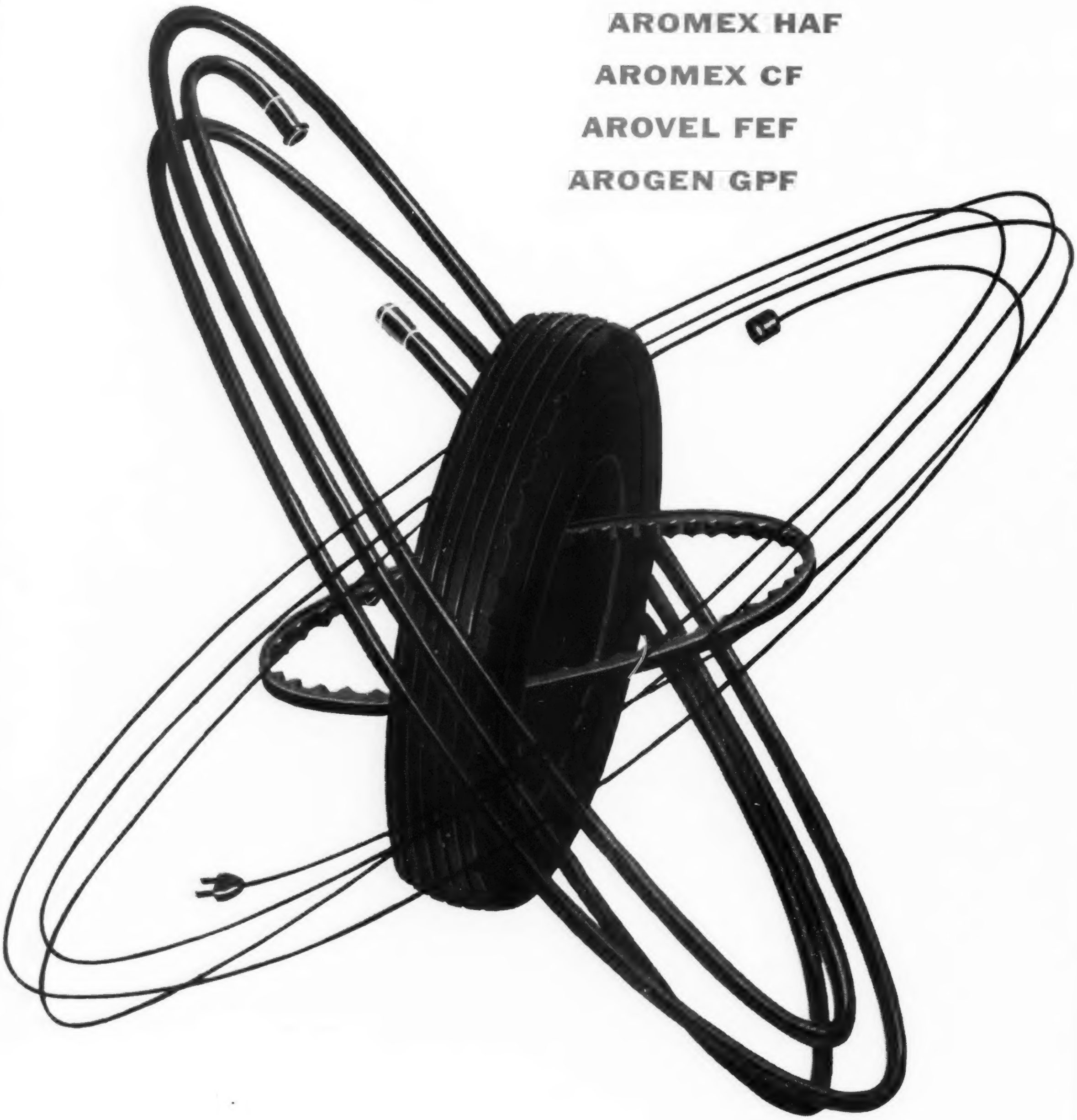

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EDITORIAL

SEPTEMBER, 1957

Engineering Manpower Report Deserves Special Attention

"THE Nation is currently faced with a shortage of scientists and technical personnel. Effective utilization of our available technical manpower has therefore assumed critical importance. Yet actually very little is known about industry's utilization of engineering and scientific manpower. Little of comprehensive nature has been written on how engineering productivity can be improved."

The above statements were taken from the foreword of a special report for management by nine students at the Graduate School of Business Administration of Harvard University, entitled "Engineering Manpower—How To Improve Its Productivity," prepared at the direction of Prof. George F. Doriot. It is published by Engineering Management Reports, P. O. Box 161, Cambridge 38, Mass.

Much attention has been directed in recent years to means of increasing our supply of technical manpower, but the supply does not promise to catch up with the demand for some time to come. Improving the utilization of the existing pool of technical manpower is therefore a most important short-term objective and is the reason for making special mention of this report in this column.

The Harvard report points out that some managements may have lost touch with the engineer as our industrial organizations grew in size and complexity. Also, it may be that technology itself has become too complex for the layman to concern himself with its problems, and that production and sales problems have required more attention in a decade in which competition has been hot and heavy.

"But whatever the reasons, it seems clear that before anything can be done by management in solving some of these problems, it must gain a more thorough understanding of its engineers. Executives must know and appreciate how engineers think and work; what motivates and what does not motivate them; what conditions and equipment they need, and how they must be handled. Only after executives and administrators have learned to know and understand their engineers better, can they hope to take actions which will be effective in improving engineering productivity."

Not only does management need to understand its technical personnel better, but the latter in turn need a better understanding of management and its problems. Last month we mentioned some of the findings of a report by the American Institute of Management on "Research and Development in the Corporation," which described how some of the best companies in America plan their research, choose their personnel, and plan their facilities. The Harvard report surveys planning, leadership, compensation, etc., with emphasis on improving the productivity of technical manpower.

The study of these reports is recommended to *both* management and technical personnel in the rubber or any other industry. Technology and technical manpower will continue to increase in importance, and their maximum effective utilization is essential to the best interests of management, the scientist and the engineer, and the country as a whole.

R. G. Seaman

Improving the Carbon-Rubber Bond[1]

By H. A. BRAENDLE
Columbian Carbon Co., New York, N. Y.

The fact that there is a specific mutual attraction between carbon black and rubber has been recognized for some time. Dry mixing of carbon black and rubber may be not only reaching a point of "diminishing returns," however, but may be actually more harmful than beneficial as far as dispersion of the black in rubber and properties of the final vulcanizate are concerned.

Rubber in the latex form and carbon black are both colloids, and therefore if mixing were done while both were in the form of aqueous dispersions, maximum advantage of the affinity of one for the other should be realized. An improved type of latex masterbatching has demonstrated better dispersion and an average of 15% better road wear in tire treads.

LATE in the Eighteenth Century, Immanuel Kant laid a foundation for his philosophy by stating, "We perceive things in space and time because of the nature of our senses."

The approach to the problem of carbon black reinforcement of rubber has been in the same sequence. Emphasis has rightly been placed on the special disposition or dispersion of carbon black in rubber as a prime factor for the effective use of carbon black. The present paper has to do with the second of Kant's elements of perception, viz., that of time.

[1]Presented before the Joint Conference ACS—CIC Divisions of Rubber Chemistry, Montreal, P.Q., Canada, May 15, 1957.

Special Disposition

In 1820, Thomas Hancock discovered that he could take scraps or cuttings of India rubber and masticate them into coherent masses. From these he could cut sheets or blocks just as readily as from the original imported pieces of rubber. He no longer had to select suitable sizes and shapes from the imported crude to make his cut rubber. He soon found that for even the small masses of one pound which he kneaded in his nail studded cylinder masticator, an inordinate amount of power was required, and he had to put two men on the handle of the machine.

The Author

Harold A. Braendle, assistant to the vice president, Columbian Carbon Co., received his B.A. and M.A. degrees both from the University of Toronto, Toronto, Ont., Canada, in 1916 and 1918, respectively. He specialized in physics.

Mr. Braendle was first a Fellow of the National Research Council of Canada, next worked for Ames, Holden & McCready Co., in Montreal, and then the Ames Holden Tire Co. from 1918 until 1927. That year he joined Binney & Smith Co. in New York, where he remained until he went to Columbian Carbon Co. in 1936. He has been concerned primarily with the manufacture of carbon black and its use in rubber.

Mr. Braendle is a member of the American Chemical Society and the American Physical Society.

"Mill" mixing of dry colorants and in turn of reinforcing pigments soon followed.

After Hancock's basic discovery of the plastic working and cohesion of rubber, progress in this field has been primarily in the direction of building bigger and stronger machines requiring ever-increasing horsepower to drive them, with ever-increasing damage to both the rubber and the carbon black, as well as to some of the other compounding ingredients.

After 1910, when the impingement carbon blacks were found to have an exceptional toughening action on rubber, most of the work on pigment dispersion was done on carbon black. If carbon black could be dispersed in rubber by a new machine or procedure, then other pigments generally could be also.

In 1920, Wiegand (1)[2] pointed out the role of fineness in the pigment reinforcement of rubber, and this observation served further to focus attention on dispersion. In 1929, Twiss (2) stated the problem rather neatly when he said that zinc oxide and carbon black should be so dispersed in rubber as to reestablish their smokelike character within the rubber. Much discussion ensued as to the nature of the special distribution of carbon black in the rubber with regard to ideal, optimum and actual. This discussion was based on the rubber's being a true continuous phase and the possibility of packing in carbon black in tetrahedral arrangement.

To explain the comparatively low optimum loadings of carbon black in rubber, Wiegand (3) in 1936 proposed the discrete rubber theory. He proposed a concept in which rubber rather than carbon black was essentially the inside phase. Striving for Twiss's ideal, Gerke (4) and his associates were granted a patent on a method of obtaining a particulate or smokelike dispersion of carbon black in rubber. They used electrical resistivity of the mix as their criterion of dispersion.

Based on electrical resistivity measurements and on examination of microtome sections of cured tread stocks with the electron microscope, for example, much thought has been given to the significance of the flocculated appearance of carbon black in rubber. Except for Gerke's description of his product, this type of dispersion seems to be the actual and possibly the optimum spacial arrangement for strength with resilience, provided it is reached by the right path. The idea has been pretty well abandoned that carbon black flocculates by carbon black particle-to-particle attractive forces. Both Parkinson (5) and the present author (6) are agreed that the force which brings the carbon black particles into contact during vulçanization lies in the rubber molecular chain, and that during processing prior to vulcanization a good approximation to a smokelike dispersion should be reached.

High H. P. Banbury Mixing

Because of the very nature of the equipment used and the fact that rubber, whether natural or synthetic, is most generally mixed in the dry, bulk form, the preferred method to attain this "smokelike" dispersion of black in rubber is to mill the carbon black with an elastomer of high viscosity.

Dry mixing seems to have been pushed about as far as it can go, however, both from the point of power input and type of machine, whether the latter be roll mill, Banbury mixer, extrusion-type mixer, pelletizer, etc. In fact it would seem that this approach is not only reaching the zone of "diminishing returns," but may be actually more harmful than beneficial with regard to dispersion and properties of the final vulcanizate.

In this connection, consider, if you will, what goes on in modern, high-speed, high-pressure Banbury mixer during the rubber compounding operation. Today's cost competition calls for shorter and shorter Banbury cycles and therefore tremendous power input.

Let's follow such a Banbury mixing cycle: Styrene-butadiene rubber (LTP, e.g.) is dropped into the mixer; the ram is down just long enough to push the rubber through the throat of the mixer; the ram is brought up; black is added, and, say, some oil. The ram is brought down again. There is a large amount of horsepower exerted on the mix by virtue of the combination of higher-than-normal ram pressures and higher-than-normal rotor speeds. Picture the rubber folding and refolding and engulfing handfuls of carbon black and squeezing it with terrific pressure, compacting it with a force it has never before experienced and then shearing it apart again and pushing it and shearing it into the rubber. It has been supercompacted and then subjected to super-shear to undo the damage of the supercompacting.

Demand for Densed Black

Loose black, once the reinforcing power of carbon black was recognized, wasn't acceptable as the best form for use in rubber goods manufacturing. It was followed, therefore, by densed, heavy compressed, double compressed and, in due course, dustless or beaded black for bulk handling. Anyone in the carbon black industry can attest to our dilemma on bead quality. The rubber industry customer wants carbon black beads with all of the following qualities at the same time: (a) higher and higher density to provide maximum economy in warehousing; (b) higher and higher bead strength to stand blowing through ducts and around corners without breaking; (c) uniform spheres (no fines or dust); so they will run out of a car and through automatic weighers and into Banbury mixers, like water; (d) beads hard enough for all this type handling and yet soft enough to break down into the original ultramicroscopic particles immediately on contact with the rubber are desired. The beads are always too hard to disperse or too soft to handle, according to the compounder.

Improvements Suggested

The whole business of present-day compounding and mixing seems to be at cross-purposes and not only with regard to the carbon black. The rubber itself is coagulated, dried, pressed into sheets or baled without sheeting, and then plasticized and milled to expose ever fresh surface to the compounding ingredients. Every plant

[2]Figures in parentheses refer to bibliography references at the end of this article.

superintendent from Thomas Hancock on has been conscious of the power cost of these operations.

Dissatisfaction with this state of affairs is not new. As early as 1925, Wiegand (7), in describing "The Rubber Compound of the Future," stated:

"In general this will be one emancipated from all breaking-down influences and endowed with all of the setting-up factors. It may be mixed in latex form with a reinforcing pigment completely and uniformly dispersed in tetrahedral piling; a pigment the surface energy of which will be sufficient to prevent any volume increase at any strain."

In the discussion following the formal presentation he stated further:

"I have flowed gas back into the mixing, with carbon tetrachloride and benzol in equal quantities, and have increased the resultant tensile properties by 25 percent. In my judgment, solvent compounding is thoroughly worth while thinking about."

Again in 1927, Wiegand (8) went still further when he said:

"The present brutal methods of driving carbon black into rubber must be replaced . . . we should all of us welcome . . . an energetic attack upon the problem of making available the enormous surface energy of the carbon black phase without the existing disruption and degeneration of its rubber matrix."

The idea of flowing gas black into a colloidal matrix with the help of a solvent as a disappearing emolient has a much earlier background. The ancient Chinese (9), in preparing their incomparable inksticks, swelled the binding matrix comprising cowhide glue with water and heat to assist in slipping the carbon black into the glue prior to dispersing it in the matrix by shear via pounding in mortars and on anvils.

These expedients have, however, found little or no practical adoption in the rubber industry.

Carbon-Rubber Affinity

In addition to the recognized roles of fineness and dispersion of pigments used for reinforcing rubber there is still another aspect to the problem, viz., the question of something specific or unique in the mutual attraction of carbon and rubber. In this area there is far from unanimity of opinion as to the cause of this affinity between the two, except possibly that both are organophilic.

Non-carbon pigments have been made of a fineness exceeding that of commercial tread-type carbon blacks. In the laboratory and in some specialized applications and properties these are useful, but for the toughening of tire tread rubber to withstand high-speed travel, overloading, rough roads, rapid acceleration or deceleration, carbon black is still unique in combining resilience with toughness to an equalled degree.

Many colloids have been added via latex combinations as well, e.g., resins (10), lignins (11), etc., with some success, but again not for tough high-speed tire service. Today we accept the increase in tensile strength of the styrene-butadiene copolymer from a few hundred psi. to 3,000 to 4,000 psi. as commonplace, but to Bostrom and Lange (12) it was so specific that they called it the carbon effect. Further support for this view was developed by Columbian Carbon Co. (13): to get good snappy cures without the penalty of falling tensile requires 350 to 400 acres of carbon surface per 100 pounds of SBR.

The work of Fielding (14) on bound *Hevea* rubber also supported the idea that there was something unique about carbon black and its affinity for natural rubber. When we tried to apply the same test to the styrene-butadiene copolymers, the problem became more difficult. It was not possible to say whether the benzene insoluble residue was carbon bound rubber alone or a mixture of bound rubber and rubber gel. The term "carbon-rubber gel complex," [or carbon gel (15, 16) for short] was adopted to cover both effects.

The discovery of the positive temperature coefficient of the carbon gel effect (15-17), the resultant need of mixing temperature control, and the translation of this into significant road wear enhancement seem to add weight to Bostrom and Lange's original description of the phenomenon as a carbon effect. Whether this effect is chemical or physical (18), or both, is a question outside the present discussion. The fact remains that there is a definite affinity between these two colloids, which then leads to the question: Why not handle them as colloids or more precisely in aqueous suspensions? This is the point where the element of *time* enters.

The Latex Approach

It is only logical that these two colloids should be brought together and allowed to exercise their affinity for each other at the optimum point in their respective life histories, in other words, as dispersions in water. This idea is by no means new. Even before the discovery of vulcanization Thomas Hancock (19) was granted a patent on August 5, 1830, on "Ornaments, etc., by Liquid," in that patent he states:

"The principal ingredient used in the improvements for which the patent is granted is liquid caoutchouc, which is obtained from South America, the East Indies, and other places, and when dried forms the substance called India rubber. . . ."

Further on, in discussing the addition of fibrous or other ingredients to his liquid caoutchouc, he states:

"The colouring substances, when solid, must first be ground very fine in water, and the whole composition well stirred and mixed together; but no more of the colouring matter must be used than is necessary to give the colour required."

A century later Twiss (2), in the same paper in which he described the ideal of a smokelike dispersion of reinforcing agents in rubber, said:

"It is also possible to effect very complete dispersion of other powders, e.g., carbon black in water (with the aid of protective colloids or dispersing agents) before introducing them into the latex. In this way proportions of a compounding ingredient can be used greatly in excess of those possible by ordinary dry mixing operations. The possibility of incorporating 100 percent and more of carbon black in rubber opens up a new range of com-

pounds with possible attractions both in mechanical properties and price. Subsequent mastication can be substantially eliminated (B.P. 327,451) (20)."

Many experimenters were similarly interested in compounding and handling rubber and compounding ingredients in the form of aqueous dispersion, and a group of patents is listed in the references (21-36). These patents describe the use of pigment, generally carbon black, in dispersed form suitably stabilized by dispersing agents, protective colloids, or the like; spray drying of mixtures of pigment suspensions and latex; carbon black as a coagulating agent for the concentrated *Hevea* latex during stirring or mixing; and even alternate spraying of latex and pigment dispersions on to or into a form previously warmed.

Despite this optimism, *Hevea* latex compounding or masterbatching with carbon black was primarily of academic interest if for no other reason than the fact that these two colloids were produced chiefly on opposite sides of the globe, and the economics were consequently unfavorable. *Hevea* latex was therefore confined to such important areas of use as dipping processes ranging from tire cord insulation to surgeons' gloves and more recently foam rubber.

SBR Latex Masterbatches

With the establishment of a synthetic industry in the U.S.A. the economic handicap of latex masterbatching of carbon black was eliminated, and it is not surprising, therefore, that much work was done on this (37-41), and many patents (42 to 56) were issued.

In general this new work followed the pattern established for natural rubber. A commercial black rubber process was set up within the SBR synthetic rubber industry during government ownership and operation. This process is summarized by Adams and Howland in Whitby's book on synthetic rubber (57). It follows closely the principles set up by Twiss (2). Much black masterbatch has been made in the last few years by this process in regular SBR, cold rubber, and oil-extended rubber, as shown in Table 1.

Experience over the years, however, has shown that tire treads made from this type of carbon black masterbatch or black rubber are deficient in wear on the road by something of the order of 5% to 10% when compared with dry mixed (i.e., Banbury) treads of the same composition. This deficiency of carbon black masterbatches, despite the convenience of their use, may explain the fall-off in demand for this type of black rubber, as indicated in Table 1.

The Columbian Process

A reexamination of the SBR latex black masterbatching process apparently was needed. Whenever aqueous dispersions of black are made for sale, as such, it is necessary to add dispersing agents, peptizing agents,

Fig. 1. Flow diagram of Columbian Carbon Co. latex masterbatching process. Intimate mixing of the carbon black and the rubber latex takes place in cylindrical mixing device just before coagulating tank

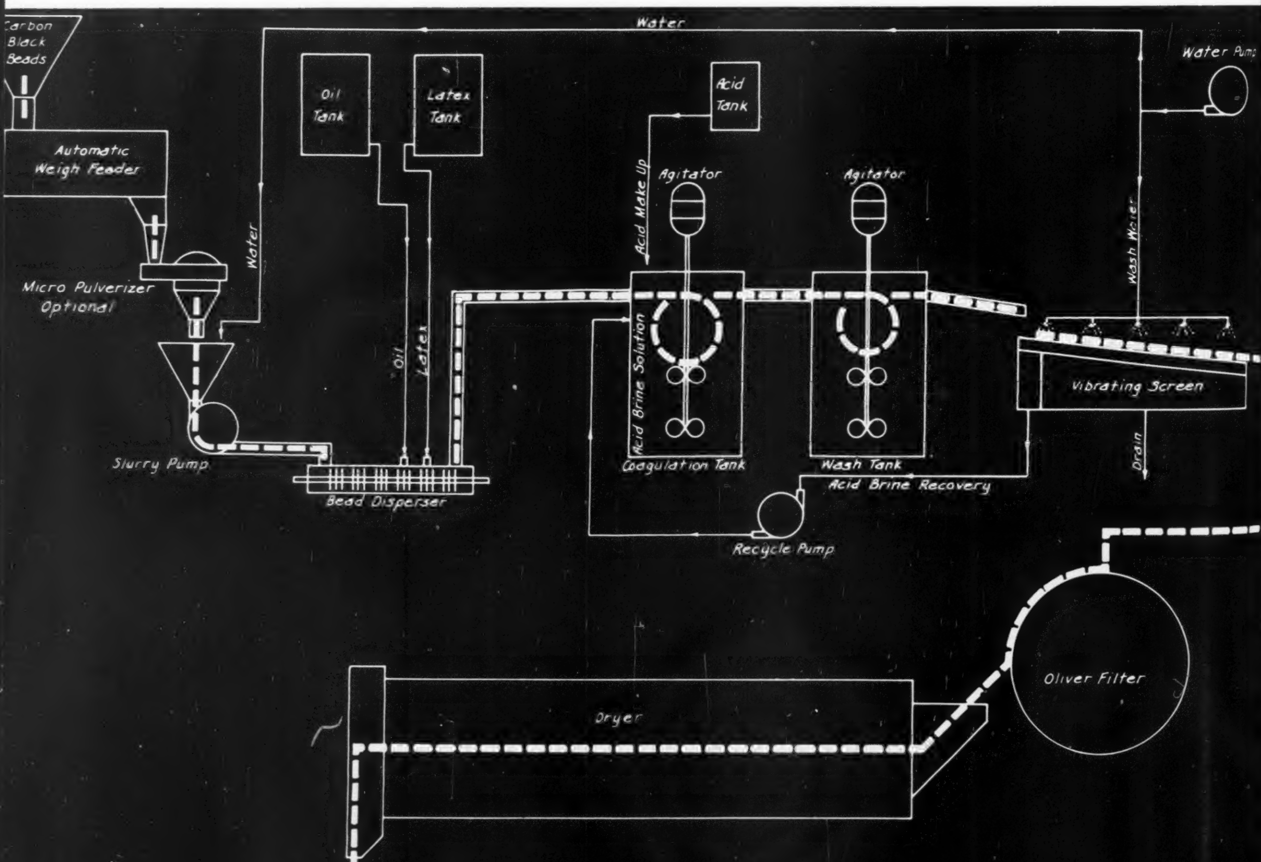

TABLE 1

Year	Thousand Long Tons of Black Masterbatch
1951	124
1952	132
1953	118
1954	77
1955	101
1956 (est.)	99

protective colloids, or combinations of these. It is well known that carbon black irreversibly adsorbs dispersing agents used for the preparation of aqueous dispersions. In all probability the organophilic end of the dispersing agent remains after coagulation and preempts or blocks off the sites at which the rubber could cross-link with the carbon black.

In dry mixing none of these additives, with the possible exception of fatty acid (58), ever enhanced the rubber-carbon bond as measured by wear. Then why use any of these additives in a black latex process? The problem is to disperse the black in water and keep it dispersed. Grinding in a wet paste, we know to be impractical from long and sometimes costly experience. It seemed worth while to try to disperse the black by some form of violently turbulent hydraulic action. This method was worked out, but as soon as agitation stopped, the black settled out.

The next thought was to keep the black stirred up once it was dispersed and to stir in the latex under conditions of comparable turbulence. Here then was the idea of a continuous process. Various means of accomplishing this type of mixing were tried, and to date the most satisfactory method found uses a high-speed stirring device rotating at about 4,000 r.p.m., equipped with a succession of rotating blades and stators to create maximum turbulence. This method disperses the black with water only. It keeps the black in suspension. It continuously and uniformly mixes the block slurry and the latex to a blend, uniform even in a micro range. A flow sheet of the Columbia latex black masterbatching process is shown in Figure 1.

The great affinity of black and rubber and the high time rate of reaction between these two hydrophobic colloids were shown by the discovery that the carbon black acted as the creaming agent necessary to get a porous crumb for good washing and drying. So rapid is the reaction between the colloids that the interval between the onset of creaming and full acid coagulation has become probably the most critical element of the whole process.

Columbian process SBR black masterbatches made with HAF (Statex R) and ISAF (Statex 125) black, when road-tested in experimental tire treads, showed marked improvement in road wear. These stocks, when compared in tire treads with conventionally mixed identical stocks of the same base polymer, have given improvements in road wear ranging from 6% to 30% with an average of 15%.

It was also found possible to start with high-molecular-weight polymer latex and made black masterbatches with 25 or 37.5% oil extension on the rubber and containing 50% of carbon on the extended polymer (oil-black masterbatches). Generally speaking, it is desirable, when making a regular LTP-SBR black masterbatch, to add the major part of the normal processing oil to the masterbatch in the same process.

This method has the advantage of making a bale of black rubber that is soft enough to drop into the Banbury for further compounding without risk of breaking the mixer, and it eliminates the tedious job of adding oil to a masterbatch of black and rubber alone as was the case heretofore. Also, when most of the oil is masterbatched, the take-up of the remainder of the processing oil of the compounder's choice at a later stage in the mixing is greatly accelerated when working with the Columbian process black masterbatch. A typical black rubber comprises: rubber, 100; black, 50 to 55; oil, 8 to 10.

This process does not force the black into the latex droplet, but the process does distribute the latex droplets and the black particles to a hitherto unattained degree so that the final dispersion and bonding of the black in the masticated rubber can begin the instant the batch starts around the Banbury. There is no dry black to be compressed and thereby rendered difficult to disperse. A Banbury or extrusion run is still necessary not only to effect the penetration of the black into the rubber, but to generate enough heat to tighten the bond between carbon and rubber in the carbon gel complex.

In general the Columbian Carbon process (59-60) makes possible: (a) lower Mooney viscosity compounds; (b) much better dispersion of black in the rubber; (c) better hysteresis properties of the vulcanizate because of the better dispersion of the carbon black; and (d) an average of 15% better road wear with SBR treads.

Summary and Conclusions

Dry mixing involves compacting latex into solid rubber and then tearing it down to make a place for the carbon black. Likewise it involves compacting the carbon both before and after it enters the Banbury and then tearing it apart to develop its full surface. Such operations involve the application of enormous compacting and shearing forces that do neither colloid any good.

By recognizing the *time* element the two colloids are brought together when they both are in a dispersed phase and therefore free to act as colloids; and by taking advantage of the *time* rate of this reaction the process effects the best spacial distribution of black in rubber so far attained. Nothing is added to interfere with the normal affinity of these two colloids. A better distributed and stronger bond results, as is evidenced by substantially enhanced road wear in tires made from such rubber.

Acknowledgment

This process would not have reached success without the enthusiastic assistance of the author's associates, particularly George Heller and J. W. White, of Colum-

bian Carbon Co.'s Hancock Development Laboratory. Sincere thanks are also due to the various polymer companies who made latex available and to the various tire companies who cooperated in the evaluation of the process and who offered encouragement along the way.

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Stronger Rayon Tire Cord

A new far-stronger rayon yarn for tires, called "Super-Suprenka", with 45% more cord strength than those considered top quality three years ago has been developed by American Enka Corp. Fatigue quality is also at a very high level, and resistance to rupture by impact exceeds that of nylon cords of standard construction, according to the company.

The new yarn has been thoroughly evaluated by numerous tests in various laboratories and is said to represent an important breakthrough into the region of very high cord strengths. A new technology in the production of rayon tire yarn is involved.

Electronic Pendulum for Evaluating Impact Absorption of Foam Materials[1]

By C. S. WILKINSON, JR.
Goodyear Tire & Rubber Co., Akron, O.

The mechanical and electrical features of an impact pendulum machine adapted for use in the evaluation of foam materials for shock and vibration absorption applications are described.

Such characteristics as energy absorption, peak deceleration, duration of maximum deceleration, and rate of onset of deceleration must be considered in the development of suitable foams. The machine described is a useful device in the laboratory evaluation of these properties.

INCREASING use is being made of foam materials as shock absorbers. In such applications as automobile crash pads it is not only necessary that the foam be able to absorb the energy, but that it do so without subjecting the impacting body to excessively high deceleration. The rate of onset of deceleration and the duration of maximum deceleration must also be considered. In other applications, such as vibration damping, the amount of energy which can be absorbed may be of primary importance, with maximum deceleration only a secondary consideration. In order to determine whether experimental foams being developed for various uses meet established criteria it is necessary to set up suitable methods for their evaluation in the laboratory.

The physical pendulum is a simple and convenient machine for producing controlled impacts. Because of the extremely short duration of the phenomenon, however, and the number of items of information required, measuring and recording of data become a problem. This difficulty may be overcome by the use of electronic and photographic instrumentation.

The machine described here was designed primarily to simulate the conditions prevailing when a passenger's head strikes the safety pad during an automobile collision. The hemispherical shape of the pendulum bob and its weight are in keeping with this idea. The design is flexible enough, however, that bobs of different size or weight may be substituted. Impact velocities are in the order of 10 miles per hour.

Description of Machine

The mechanical design of the machine follows conventional practice, as may be seen by reference to Figure 1. The support is constructed of heavy channel steel rigidly welded to thick plate. The bob is turned from aluminum into a hemispherical shape having a radius of 3¼ inches. It is attached to the lower end of a shaft built up of two thin-wall aluminum tubes 48 inches long. Using two tubes rather than one prevents twisting the bob out of position. The upper end of the shaft is fastened to an axle which rotates in ball bearings.

There are several unique details of the measuring system. A Statham accelerometer, Model A5A-200-350,[2] of the strain-gage type is fastened to the back side of the bob to indicate deceleration upon impact. The direct-current output signal from this gage is preamplified by an Ellis transistor amplifier, Model BAM-1.[3] Provision is also made within this instrument for a supply voltage to the accelerometer and a calibration system. The amplified voltage from the Ellis passes to

[1] Presented before the Joint Conference of the Rubber Divisions, ACS and CIC, Montreal, P.Q., Canada, May 15, 1957. Contribution No. 222 from the research laboratory of the Goodyear Tire & Rubber Co.
[2] Statham Laboratories, Inc., Los Angeles, Calif.
[3] Ellis Associates, Pelham, N. Y.

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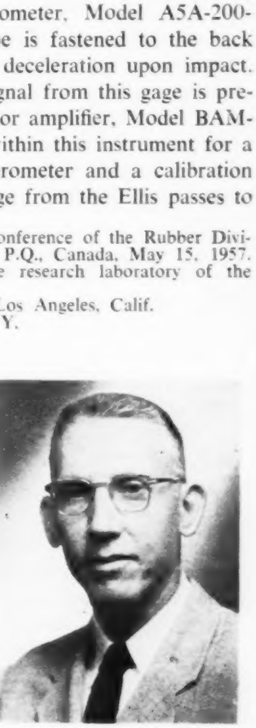

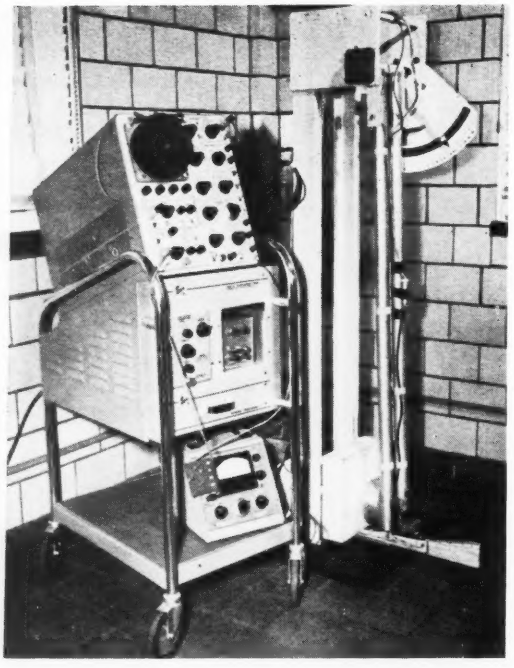

Fig. 1. Impact pendulum apparatus for foam and electronic instrumentation

the lower input channel of a dual-beam Tektronix oscilloscope, Type 535.[4]

Penetration of the bob into the foam is indicated by a transducer developed especially for this purpose. It consists of a wire-wound linear resistance strip covered on the top surface with a 0.010-inch thick strip of conductive rubber. This strip is mounted at the base of the machine directly below the pendulum in an arc shaped support. Two dry cells in series with this strip produce a voltage gradient along it. A spring-supported rolling contact at the end of the pendulum shaft moves across the resistance strip coincident with the penetration of the hemisphere into the foam. The voltage sensed by the rolling contact is thus proportional to the penetration. It is sufficiently large to be fed into the upper channel of the Tektronix oscilloscope without preamplification. Figure 2 is a close-up view of this part of the machine.

The height of rebound of the pendulum is shown on a sector at the upper end of the support. The pointer works in a fashion similar to those found on the ordinary pendulum devices.

Design Formulae

Because the pendulum undergoes angular motion the calculations involved in its design are slightly more complicated than those for linear-motion machines. This problem is strictly one of design, however, and once the constants have been determined, the pendulum may be utilized in the laboratory with confidence and ease.

The formulae presented here may be used as a guide in deciding upon suitable dimensions for the machine in designing for any particular purpose. They may also be used in checking and calibrating it for use. For the sake of clarity each item is taken separately.

Weight

The total weight of the moving system and its distribution between components must be accurately known. Each piece may be weighed separately, and their sum taken for the total.

Center of Gravity

The exact position of the center of gravity must be located. This may be found by equating the sum of the moments of the individual parts to the moment of the total weight considered to be concentrated at the center of gravity.

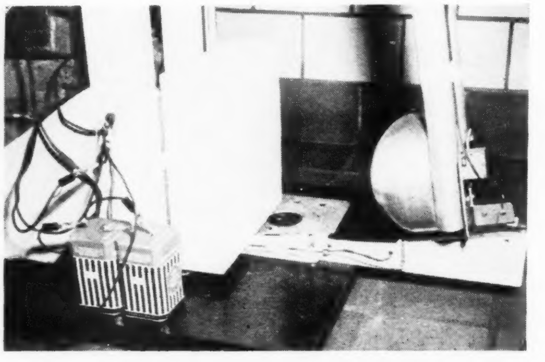

Fig. 2. Close-up of penetration transducer mounted under pendulum bob

Moment of Inertia

This important quantity may be found by either of two independent methods. By the first, each component part is weighed, and its dimensions are obtained. These data are put into applicable standard engineering formulae for calculating moments of inertia of bodies from their geometric shapes. The moment of inertia of the whole pendulum is the sum of the moments of inertia of the components.

In practice, the moment of inertia of the ordinary pendulum may be calculated with sufficient accuracy, using only two formulae. The first is applied to the shaft and such coaxial cables etc. as may be attached to it. This formula is:

$$I = \frac{m\,l^2}{3}$$

where m is the mass of the shaft and l is its length. The bob and instruments attached to it may be lumped together and considered as a concentrated mass, m, to use in the second formula:

$$I = m\,r^2$$

where r is the radius from the axis of rotation of the pendulum to the center of the bob.

The second method for finding the moment of inertia makes use of the principle that the period of a physical pendulum undergoing small oscillations is proportional

[4] Tektronix, Inc., Portland, Oreg.

to the square root of the moment of inertia. The formula is:

$$T = 2\pi\sqrt{\frac{I}{wL}}$$

Here T is the period, w the weight of the pendulum, and L the radius from axis to center of gravity. This equation may be solved for I by inserting the experimentally determined value for T and the calculated values for w and L as found above.

Radius of Gyration

This quantity is defined as the radius from the axis of rotation of the pendulum to a point where, if all the mass were concentrated, the pendulum would have the same moment of inertia. It may be found using the formula:

$$k = \sqrt{\frac{I}{m}}$$

where I and m are as defined previously.

TABLE 1. PHYSICAL CONSTANTS OF PENDULUM

Weight	14.86 pounds
Mass	0.461 slugs*
Center of gravity	31.6 inches
Moments of inertia (calculated)	4.63 slug-ft²
(By period)	4.55 slug-ft²
Radius of gyration	37.9 inches
Center of percussion	45.3 inches
Impact	48.0 inches

*One slug, or geepound, equals 32.2 pounds.

Center of Percussion

This quantity, also called the center of oscillation, is defined as the radius from the axis to a point where, if all the mass were concentrated, the pendulum would have the same period. This distance, d, may be found using the formula:

$$d = \frac{I}{m\,L}$$

where I, m, and L are as above. It is important that the center of percussion lie near the center of impact if excessive vibration is to be avoided.

A summary of the above quantities for this machine is given in Table 1. Notice that gravitational units are used throughout.

Velocity and Energy Equations

The constants found in the preceding section may now be used to develop equations for calculating impact velocity as a function of drop height and the kinetic energy resulting from the fall.

At the highest position of the pendulum prior to fall its energy is all potential, as expressed by the equation:

$$\text{Potential energy} = wh$$

where w is the weight of the pendulum and h is the height of its center of gravity.

When the released pendulum reaches the bottom of its fall, all of the potential energy has become kinetic and may be written as:

$$\text{Kinetic energy} = \frac{I\omega^2}{2}$$

The ω in this equation is the angular velocity at instant of impact.

Neglecting the slight losses due to friction in the machine, the two above expressions for energy may be equated to give:

$$wh = \frac{I\omega^2}{2}$$

This equation may be used to find the linear velocity at the radius of gyration by substituting mk^2 for I and V/k for ω. Also, w may be replaced by its equivalent, mg, where g is the gravitational constant. Finally, the equation becomes:

$$V = \sqrt{2\,gh}$$

By use of simple geometric proportion it follows that the linear velocity, V, of the bob at the instant of impact is given by:

$$V = \frac{r}{k}\sqrt{2\,gh}$$

where all of the letters are as previously indicated.

The energy expended by the pendulum at impact may be calculated in the following way. Consider the diagram shown in Figure 3. Just before impact the pendulum is at point A. It is moving at maximum velocity, and its energy is all kinetic. Upon entering the foam it is opposed by visco-elastic forces which slow

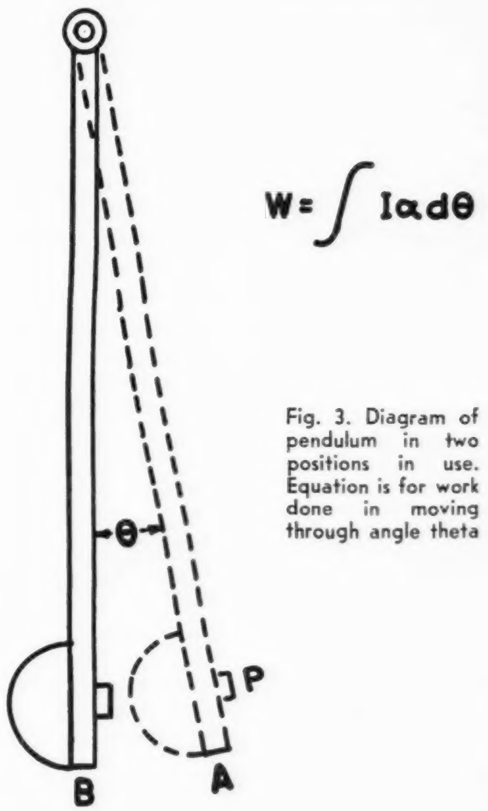

Fig. 3. Diagram of pendulum in two positions in use. Equation is for work done in moving through angle theta

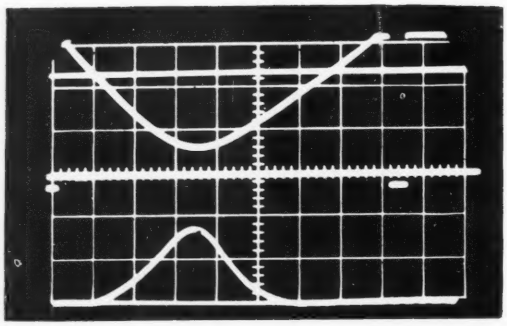

Fig. 4. Photograph of oscilloscope record of acceleration and deceleration of pendulum bob after contact with foam sample

it down, i.e., decelerate it. In working against these forces as it moves from A to B, it sweeps through the angle θ and suffers a deceleration α. Its torque, τ, is related to the moment of inertia and deceleration by the equation:

$$\tau = I\,\alpha.$$

The work done, or energy expended is given by the integral:

$$\int \tau d\theta$$

This may be written

$$W = \int I\alpha d\theta$$

As a matter of experimental convenience deceleration is measured by a linear motion accelerometer at point P; so α must be replaced by its equivalent a/r, where a is linear deceleration, and r is the pendulum impact radius. At the same time angular displacement is replaced by its linear equivalent x/r at point P, where x is the penetration into the foam. With these changes the energy equation becomes:

$$W = \frac{I}{r^2}\int a\,dx$$

Since the accelerometer is calibrated in g units of deceleration, one other change may be made to take this fact into account, so that:

$$W = \frac{Ig}{r^2}\int n\,dx$$

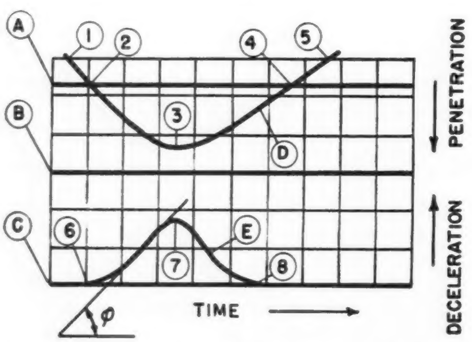

Fig. 5. Trace of oscilloscope record from Figure 4

where n is the number of g's of deceleration.

The integration $\int n\,dx$ may be done graphically, as will be shown later.

Method of Obtaining Data

After the slab of foam has been fastened to the base of the support, the pendulum is lifted to the required height and released. Upon impact, the electrical impulses from the transducers are transmitted to the oscilloscope, where they appear as traces on its screen. These are photographed with a Fairchild camera, Model F-284,[5] of the Polaroid type to obtain a picture, as shown in Figure 4. A copy of this is shown in Figure 5 where numbers have been added for aid in the explanation.

It may be seen that there are three heavy horizontal traces, A, B, and C. These are impressed on the screen, and the film is exposed to them prior to dropping the pendulum. Line A corresponds to the front surface of the foam, and B to the rear. The distance between them is consequently proportional to the foam thickness. Line C is a baseline for the deceleration trace.

Trace D is the pendulum penetration as a function of time. Its slope between 1 and 2 is proportional to the impact velocity, and between 4 and 5 the rebound velocity. Point 3 indicates its maximum penetration.

Trace E is the deceleration trace against time. Deceleration begins when the hemisphere touches the foam at 6. It increases to a maximum at 7, where the direction of the pendulum reverses. The deceleration decreases as the pendulum rebounds, becoming zero at 8 as the pendulum leaves the foam at a constant velocity.

The rate of onset of deceleration is bound by measuring the angle ϕ. A straight line is drawn tangent to the steepest slope of the deceleration curve on the entrance side. This is extrapolated to the baseline. The angle formed is proportional to the rate of onset of deceleration.

Since the penetration and deceleration traces are synchronized by the oscilloscope, the deceleration at any point of penetration may be read directly from

[5]Fairchild Recording Equipment Co., Whitestone, N. Y.

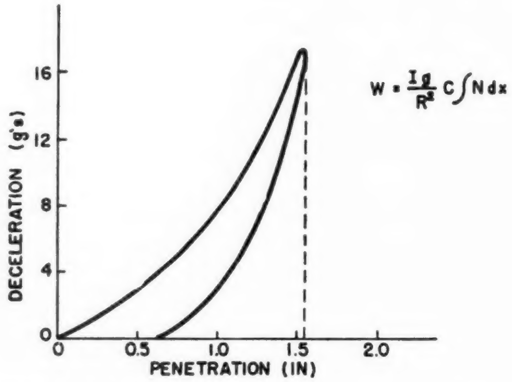

Fig. 6. Impact hysteresis loop for polyurethane foam sample

the photograph. A table of pairs of points so obtained may be used to plot an impact hysteresis loop.

Discussion of Results

To illustrate application of the method a slab of polyurethane foam was subjected to a series of impacts at increasing velocities. This was a partially closed cell foam having a density of 2.2 pounds per cubic foot.

Data from one of the photographs have been plotted in Figure 6 as an impact hysteresis loop, as mentioned above. The similarity to the familiar static stress-strain loop may be readily recognized. The area under the upper curve is proportional to the energy transferred from pendulum to foam at impact. The area under the lower curve is proportional to the energy returned at rebound.

Referring to the equation previously developed for impact energy and adding a constant, c, to allow for the scale used in plotting the graph, it may be rewritten as:

$$W = \frac{Ig}{r^2} c \int n\, dx$$

The area under the curve is measured with a planimeter, and its value inserted in place of $\int n\, dx$ to find the energy, W.

The kinetic energy possessed by the pendulum at impact and rebound may be calculated from other data to be found from the photographs of the oscillograph traces. Impact and rebound velocities are calculated from the slope of the penetration curve, as explained before. The corresponding kinetic energies may then be figured from a modification of the equation:

$$\text{Kinetic energy} = \frac{I\,\omega^2}{2}$$

Conversion factors are used to replace I by its equivalent mass and ω by the linear velocity of the bob. The equation thus becomes:

$$\text{Kinetic energy} = \frac{m\,k^2}{2\,r^2} V^2$$

where all letters are as previously defined.

Impact energy, as obtained by the integration method, should equal kinetic energy, as obtained by the above equation. Both of these values should equal the potential energy of the pendulum at the commencement of the fall, assuming, of course, negligible loss to friction.

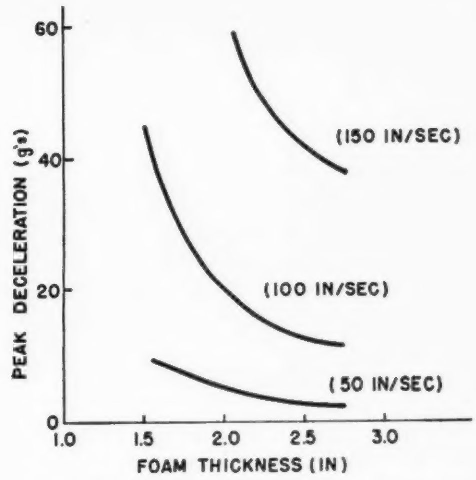

Fig. 9. Peak deceleration *versus* foam thickness

A calculation of the damping characteristics of the foam are also of interest. An absolute value in inch-pounds of energy absorbed in an impact may be obtained by a graphical integration of the hysteresis loop. Optionally, the difference between the kinetic energy at impact and rebound may be used. A second way of expressing damping is to consider it as a relative value. The absolute energy loss may be divided by the impact energy. If this fraction is multiplied by 100, the expression will be in % damping. Thus, it may be conveniently thought of as the percentage of the impact energy absorbed by the foam. Both energy loss and relative damping are of value, and neither should be used exclusive of the other.

If it has been demonstrated that friction losses in the machine are negligible, the rebound height and

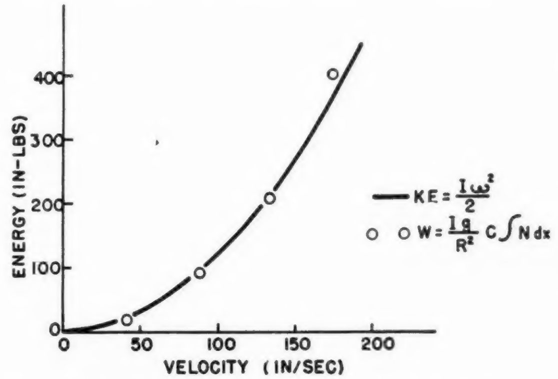

Fig. 7. Impact energy *versus* velocity for polyurethane foam sample

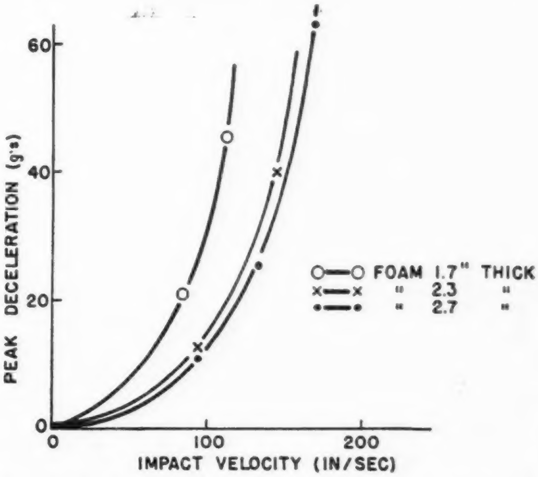

Fig. 8. Peak deceleration *versus* impact velocity for polyurethane foam sample

TABLE 2. SUMMARY OF ENERGY RELATIONS

Pendulum Height (Inches)		Velocity (Inches/Sec.)				Energy (Inch-Pounds)									Relative Damping %		
		Calculated		Measured		Potential			Kinetic			Impact Curve					
Drop	Rebd	Drop	Rebd	Drop	Rebd	Drop	Rebd	Loss	Drop	Rebd	Loss	Drop	Rebd	Loss	Potential	Kinetic	Impact Curve
1.65	0.72	45	30	41	31	24	11	13	20	12	8	19	8	11	54	40	58
6.6	3.1	90	62	88	60	98	46	52	93	43	50	89	46	43	53	54	48
14.7	7.2	135	95	133	91	218	107	111	212	99	113	207	135	72	51	53	35
26.4	11.8	181	121	174	133	392	175	217	364	212	152	402	235	167	55	42	42

TABLE 3. COMPARISON OF SEVERAL TYPES OF FOAM

Foam No.	Foam Type	Cell Type	Density (Lb/Ft^3)	Comp. at 25% (Lb/In^2)	Impact Vel (In/Sec)	Max Decel (g)	Max Pen (%)	Damp (%)	Energy Absorbed (In-Lb)	ϕ (g sec. $\times 10^{-3}$)
P1	poly-urethane	open	2.2	1.6	64	8	83	90	42	0.4
					90	30	90	90	82	4.5
					128	240	100	81	167	859.
P2	poly-urethane	part closed	2.2	2.4	64	12	72	60	28	0.8
					90	24	87	59	55	2.4
					128	90	99	59	110	31.4
					156	260	100	70	195	—
P3	polyurethane	open	2.0	0.7	64	62	99	80	37	24.5
V1	vinyl	closed	3.0	56.7	90	36	29	83	72	9.3
					128	58	38	82	152	15.6
					181	80	54	81	300	18.3
					202	95	62	79	366	20.1
					222	120	75	78	434	48.4
V2	vinyl	open	8.4	0.8	64	11	73	84	39	0.8
					90	28	92	85	79	7.2
					128	150	99	85	158	122.5
V3	vinyl	closed	7.0	1.3	64	20	87	42	20	2.4
					90	57	95	45	43	12.2
V4	vinyl	closed	7.6	6.3	64	13	58	60	28	1.0
					90	25	74	55	51	2.6
					128	60	86	52	96	8.8
					181	190	99	42	156	107.1
V5	vinyl	closed	8.6	7.3	64	14	49	76	36	1.3
					90	24	65	70	65	2.6
					128	45	79	69	128	6.2
					156	80	96	67	187	14.9
					181	155	99	68	252	71.2
M1	45/55 SBR/NR	open	6.8	0.7	64	50	95	68	32	14.9
					90	70	99	76	70	34.4

drop height may be used to calculate % relative damping, which will be 100 times their difference divided by the drop height.

A comparison of these methods of calculating energy and damping are summarized for four impact velocities in Table 2. The same slab of polyurethane foam was used in all of the tests.

In Figure 7 impact energy has been plotted as a function of measured velocity. The curve has been drawn for values of kinetic energy calculated from data taken from the photographs. The circles represent energy values calculated using the graphical integration method. Results show close agreement.

Peak deceleration values are also of interest. These were studied by using a pad of similar polyurethane foam which was successively reduced in thickness during the experiment. Starting with the pad at its original thickness of 2.7 inches, the pendulum was dropped from several heights to produce impacts of from 94 to 168 inches per second. Similar impacts were repeated after the foam had been cut to a thickness of 2.3 inches and again at 1.7 inches. Velocity of impact had to be reduced for the thinner pads.

The results of the three series of tests are shown in Figure 8. The same general type of curves are produced as those showing energy plotted against velocity. There is an increase in peak deceleration for any given velocity of impact as the foam thickness is decreased. This is perhaps indicated more forcefully in Figure 9, where peak deceleration is plotted *versus* foam thickness, using velocity as a parameter.

The maximum depth of penetration of the hemisphere into the foam has been plotted for this group of experiments. In Figure 10 the % penetration is shown as a function of impact velocity. Such a group

(Continued on Page 851)

Resorcinol-Formaldehyde Latex Adhesives For Bonding Synthetic Tire Cords[1]

By M. I. DIETRICK
Koppers Co., Petrolia, Pa.

A study has been made of the effect of certain variables in composition and processing of resorcinol-formaldehyde latex adhesives used for bonding nylon and rayon tire cord to the rubber skim coat.

The concentration of the sodium hydroxide and the composition of the latex used were found to have a pronounced effect on adhesion test values. The concentration of formaldehyde, resorcinol resin, and the total solids concentration of the adhesive compound were found to be of importance, but could be varied over a relatively wider range.

Since the results reported were based on static adhesion values determined on laboratory prepared test specimens, it is suggested that certain of these factors should be checked with complete tires in road or wheel tests.

TODAY'S tire is an excellent example of a highly engineered product skillfully designed to satisfy the requirements of the automobile industry. One of the most important and little-known contributions to improved tire design and performance has been the development of adhesives for bonding the synthetic tire fabric to rubber.

The cotton reinforced tire of the 1930's presented few problems, adhesionwise. The many fiber ends of the cotton fabric provided a mechanical bond with the rubber which was adequate to carry the load. As the load, horsepower, and operating speeds of automobiles increased, however, the need of stronger, cooler-running tires grew. Reinforcement with rayon fabric was the first step in this direction. With high-tenacity rayon, tires having a thinner sidewall construction, lighter in weight, and yet surpassing the strength of a cotton reinforced tire were possible. Similar advantages are available with the use of nylon tire cord.

With these continuous filament synthetic fabrics, however, the adhesion to rubber was poor. The reclaimed rubber-casein adhesive initially used provided improved adhesion, but failed to satisfy the requirements of today's automobile tires. In contrast, the resorcinol-formaldehyde-latex (RFL) adhesive has met these requirements and has found wide acceptance in the tire industry.

Although considerable work has been done on the development of RFL adhesives, little of this work has been published. The studies reported in this paper were performed at the development laboratory, Koppers Co., Inc., to obtain basic information pertaining to the relation between the RFL adhesive composition and the static adhesion obtained between the rubber compound and the synthetic tire cord.

Experimental Details

An 840-denier,[2] two-ply nylon tire cord was treated on a single-end dipping machine. The cord from the supply creel passed through a Kidde double disk compensator[3] (see Figure 1) which controlled the tension into the dip at 0.18 to 0.22 of a pound. Excess adhesive was removed from the cord by a jet of air.

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[1] Presented before the joint meeting of the Divisions of Rubber Chemistry of the ACS and the CIC, Montreal, P.Q., Canada, May 16, 1957.

[2] Denier is the weight in grams of 9,000 meters of cord.

[3] Walter Kidde Co., Belleville, N. J.

Don Phillips Studio

The Author

Myron I. Dietrick received his B.S. degree in chemistry from Pennsylvania State University in 1950 and has been employed by Koppers Co., Inc., since that time. He is a member of the development department, market development section of the company.

Mr. Dietrick is a member of the American Chemical Society and its Division of Rubber Chemistry.

TABLE 1. COMPOSITION OF NATURAL RUBBER STOCK

	Parts, by Weight
No. 1 ribbed smoked sheet	21.00
MPC carbon black*	5.40
Fine thermal black†	2.10
Circo Light Oil‡	0.20
PBNA§	0.20
Zinc oxide	0.60
Stearic acid	0.20
Benzothiazyl disulfide‡‡	0.20
Reogen**	0.40
Sulfur	0.60

*Micronex, Columbian Carbon Co., New York, N. Y.
† P-33, R. T. Vanderbilt Co., New York, N. Y.
‡ General-purpose naphthenic-type softener. Sun Oil Co., Philadelphia, Pa.
§ Phenyl beta naphthylamine, Neozone D, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
‡‡ Atlas, R. T. Vanderbilt Co.
** Oil soluble sulfonic acid and a parafin oil, Vanderbilt.

The treated cord was next simultaneously dried and hot stretched at 425° F. in the machine with an exposure time of 19 to 20 seconds. A tensioning force of six to seven pounds was applied to the cord during the hot stretching by means of snubbing and tensioning rolls, which were operated at a differential peripheral speed of 20%. The subsequent elongation of the cord was 16 to 18%. The cord was wound on a take-up creel and stored in a polyethylene bag until used.

The moisture regain, adhesive pick-up, and stress-strain characteristics were determined on randomly selected cords. The average moisture regain and adhesive pick-up were 0.5% and 8%, respectively. Typically treated cords elongated 9% at a stress of 10 pounds.

The static adhesion to natural rubber was determined

TABLE 2. CONTROL ADHESIVE COMPOUND

	Parts, by Weight
Water	407.7
Sodium hydroxide (10%)	8.0
Penacolite Resin R2170 (75%)	26.7
Formalin (37%)	20.3
Vinyl pyridine terpolymer latex (40%)	250.

by H-test.[4] The H-specimen was composed of 1/4-inch strips of natural rubber stock of the composition shown in Table 1, reinforced with a square-woven frictioned chafer fabric. The treated cord was sandwiched between the reinforced rubber strips and vulcanized at 320° F. and 250 psi. for 20 minutes.

The tensile force required to rupture the H-piece was determined at 250° F., using a Scott tester,[5] Model X-3, with a clamp speed of 12 inches per minute. Twenty-five specimens were tested with each adhesive, and the average force in pounds was determined. Statistical analysis of the data indicated that a deviation of two to three pounds was required for significance.

The control adhesive was selected from earlier tests and is representative of those used commercially. It was composed of a vinyl pyridine terpolymer latex and Penacolite Resin R-2170.[6] It was catalyzed with sodium hydroxide and cross-linked with 37% formalin. The Penacolite Resin is a stopped resorcinol formaldehyde condensation product in aqueous solution at 75% total solids. The adhesive was compounded by successively mixing the components shown in Table 2. It was aged 18 to 20 hours prior to test.

[4] India RUBBER WORLD, May, 1946, p. 213.
[5] Scott Testers, Inc., Providence, R. I.
[6] Koppers Co., Pittsburgh, Pa.

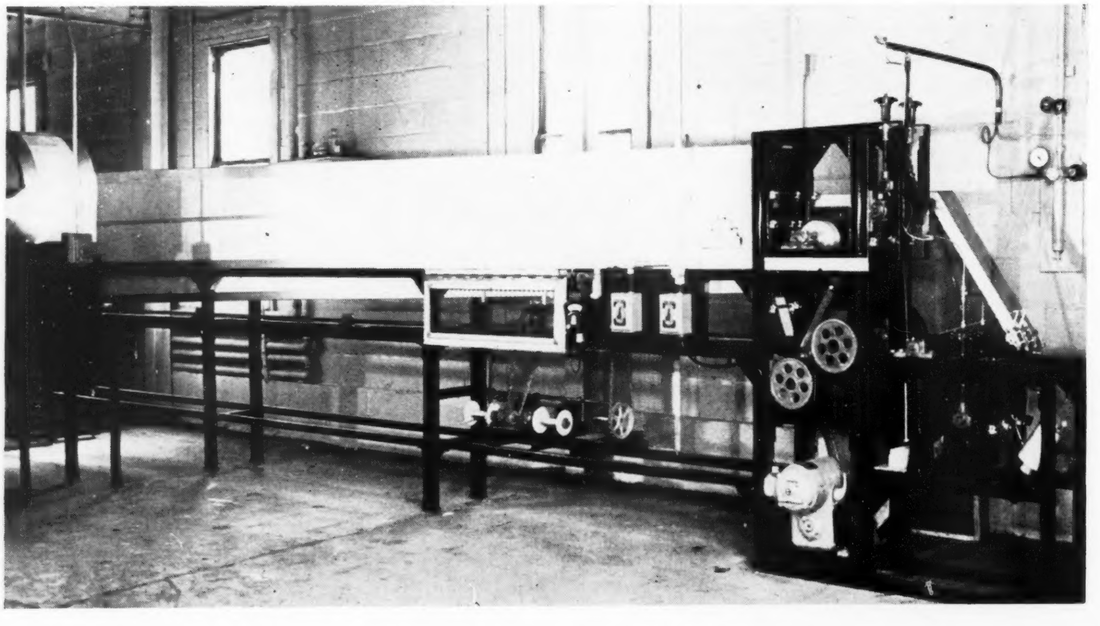


Fig. 1. Single-end tire cord dipping machine by Walter Kidde Co. used in these experiments

The work reported in this paper was done with a series of adhesives, differing from each other only with respect to the factor being studied, as compounded or processed. These modified adhesives were compared directly with the control compound (Table 2) which was tested in parallel. The factors studied were: age and stability of the adhesive; type and concentration of catalyst; the formaldehyde and resin concentration; the adhesive pick-up; and the latex composition.

TABLE 3. STABILITY OF ADHESIVE

Aging Period—Hours	H-Adhesion—Pounds at 250° F. Dip Aged at 73.5° F.	110° F.
0	8.0	8.0
2	13.2	—
6	14.6	—
24	12.9	12.6
48	14.7	—
168	15.1	15.9
336	14.3	15.0
672	12.1	11.8

TABLE 4. EFFECT OF DUAL CATALYSTS ON H-TEST VALUES

Parts Catalysts 20/Parts Resin Solids: NaOH (10%)	NH₄OH (28%)	Adhesive pH	H-Adhesion—Lbs. at 250° F.
8	0	8.5	15.8
8	2	9.1	13.6
8	16	10.1	14.2
8	64	10.7	15.6
16	2	9.7	13.9
16	16	10.2	12.3
16	64	10.8	14.0
48	2	10.8	9.0
48	16	11.2	7.1
48	64	11.5	6.2

Age and Stability of the Adhesive

The effect of aging the control adhesive at 73.5° F. was studied over an extended period. Nylon tire cord was treated with this basic composition immediately after compounding and then periodically for one month. The adhesion with this composition was moderately improved with aging two to six hours (as shown in Table 3). After this initial increase, the adhesion did not change significantly until the fourth week, when slightly lower values were obtained.

The adhesion with a similar compound stored at 110° F. decreased moderately after four weeks. It was concluded that for all practical purposes, the adhesive is stable at ambient storage conditions.

Effect of Catalyst

In parallel tests the concentration of catalyst in the compound was varied; sodium hydroxide was used in one series, and ammonium hydroxide in another. The pH of the adhesive using sodium hydroxide varied through the range of 8.1 to 12.1, and from 8.0 to 11.5 with ammonium hydroxide. Optimum adhesion was obtained with sodium hydroxide catalyst at a concentration of eight parts 10% sodium hydroxide per 20 parts resin solids. The adhesive pH was 8.3. The bond strength decreased significantly at pH values which were above 8.8 (16 parts 10% sodium hydroxide per 20 parts resin solids). These data are shown in Figure 2 (below).

The adhesion with ammonium hydroxide catalysts was less than the optimum values obtained using sodium hydroxide. No significant effect of ammonium hydroxide concentration in the adhesive was noted from the adhesion values in Figure 2.

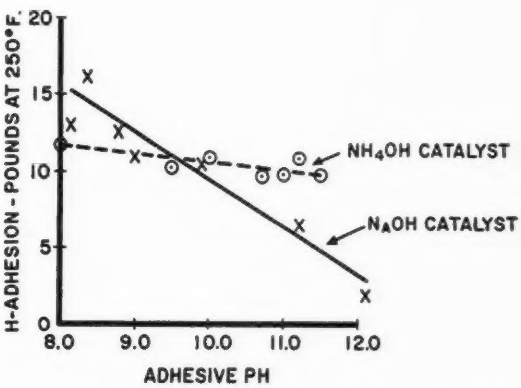


Fig. 2. Effect of increased pH obtained by addition of sodium hydroxide and ammonium hydroxide on H-test adhesion values

A third series of adhesives was compounded using eight, 16, and 48 parts of sodium hydroxide. These compositions were then adjusted with two, 16, and 64 parts ammonium hydroxide (see Table 4). As in the previous tests, the amount of sodium hydroxide was critical, and poor values were obtained with dips containing more than 16 parts 10% caustic. The concentration of ammonium hydroxide did not influence the adhesion.

In recent tests with cold rubber latices SBR 2102 and BR 2104, which tended to coagulate at the optimum concentration of sodium hydroxide, stable adhesives were compounded by adding ammonium hydroxide to the sodium hydroxide catalyzed dips. The subsequent adhesion values were excellent.

Formaldehyde Concentration

Formaldehyde was found to be an essential component of the adhesive compound. Very low values were obtained without formaldehyde (Figure 3). The adhesion approached a maximum with a compound containing 7.5 parts dry formaldehyde per 20 parts resin solids. At very high concentrations of formaldehyde, the adhesion tended to decline. It was concluded that the formaldehyde concentration should be maintained at 7.5 to 15 parts per 20 parts resin.

Resin Concentration

The resorcinol resin was a prerequisite for adequate adhesion. Nylon tire cord treated with a resin-free compound did not adhere to the rubber skim stock. The adhesion increased directly with the resin solids. Adequate adhesion was obtained with compounds containing 15 to 20 parts resin solids per 100 parts latex solids (see Figure 4).

These conclusions should be supplemented with dynamic tests or preferably with tire tests, since the amount of resin would influence the rigidity and probably the dynamic properties of the treated nylon tire cord in the finished tire.

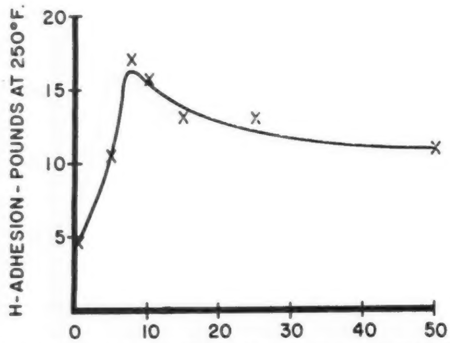


Fig. 3. Effect of formaldehyde concentration on H-test adhesion values

Adhesive Pick-up

The adhesive pick-up was varied through the range of 2% to 10% by treating nylon tire cord with RFL compositions having total solids concentrations of 5% to 23% (Figure 5). The adhesion increased moderately with the pick-up.

Here, too, the dynamic properties of the treated tire cord are important and should be resolved, since the amount of adhesive deposited on the cord would influence its rigidity and hence ability to withstand repeated flexing in the tire. Also, the cost of increased amounts of adhesive picked up on the cord must be balanced against the improved service obtained. It would appear, however, that a pick-up of 6% to 8% is adequate.

Latex Composition

Earlier tests with rayon tire cord indicated that the composition of the latex was critical. This factor was evaluated with nylon cord, using commercially available latices having various amounts of unsaturation (butadiene). The composition of these latices varied from 33/67 butadiene-styrene through to 100% butadiene. Tire cord dips were compounded by substituting these latices for all of the vinyl pyridine terpolymer latex used in the basic composition. The data (Figure 6) indicate that unsaturation is prerequisite for optimum adhesion and that a latex containing at least 70 parts butadiene per 100 parts copolymer is required.

This factor was reevaluated by compounding similar adhesives except that only half of the vinyl pyridine terpolymer latex was replaced with the butadiene-styrene latices; here, too, the adhesion was dependent on the amount of unsaturation, approaching a maximum at 50-70 parts butadiene. It is notable that the adhesion with the dips containing vinyl pyridine latex was higher than with the butadiene-styrene latices alone.

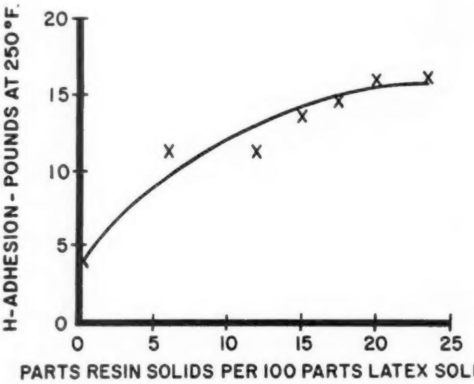


Fig. 4. Effect of resorcinal resin content on H-test adhesion values

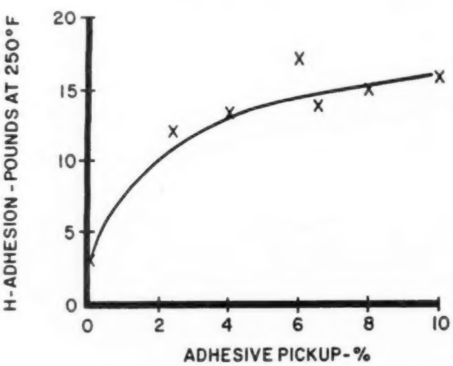


Fig. 5. Effect of adhesive pick-up in % on H-test adhesion values

Considerable rubber failure occured with the preferred formulations, indicating that these treatments provided adhesion which approached the strength of the rubber stock used. H-test values at room temperature exceeding 26 pounds were obtained. Many of the cords were frayed, indicating failure of the nylon. The tensile strength of the nylon was 27 to 28 pounds.

Summary and Conclusions

Tire cord adhesives approaching the strength of the cord, when tested cold, and the hot strength of the rubber skim stock, when tested hot, have been compounded. Several factors (the sodium hydroxide concentrations and the latex composition) were found to have pronounced effect on adhesion. Other factors such as formaldehyde concentration, resin solids concentra-

TABLE 5. PREFERRED TIRE CORD ADHESIVE COMPOUND FOR RAYON AND NYLON TIRE CORD

	Parts by Weight	
	Rayon Dip	Nylon Dip
Water	540.5	407.7
Sodium hydroxide (10%)	8.0	8.0
Penacolite resin R-2170 (75%)	26.7	26.7
Formalin (37%)	13.5	20.3
Butadiene-styrene latex-70/30 (40%)	200.	125.
Vinyl pyridine ter polymer latex (40%)	50.	125.
On Dry Weight Basis		
Pts. formaldehyde (dry) 20 pts. resin (dry)	5.	75.
Pts. resin (dry)/100 pts. latex (dry	20.	20.
Total solids—% theory	15.	18.
H-Adhesion		
250° F.	20.4	18.7
73° F.	—	25.1

tion, and total solids were important, but could be varied through a relatively wide range.

In general, these data closely parallel similar tests with rayon tire cord. Preferred formulations are given in Table 5. The difference between these compositions for rayon and for nylon tire cord are: (1) the latex composition—less vinyl pyridine is required for rayon cord; (2) the formaldehyde concentration—more formaldehyde is required with nylon cord, possibly to replace that lost during hot stretching; and (3) the total solids concentration—high solids were required with nylon cord to insure uniform pick-up.

This report has been confined to dips compounded with a preformed resorcinol resin. Similar results have been obtained using technical grade resorcinol, and formalin; here the resin is formed in situ.

The author wishes to thank Koppers Co., Inc., and his coworkers for making this paper possible. Special acknowledgment is due our many friends in the industry who encouraged and coached us in this work.

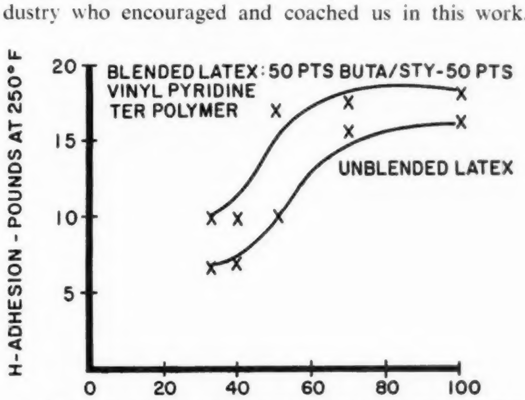


Fig. 6. Effect of butadene content in butadiene-styrene copolymer latices used in RFL compounds and in blends with vinyl pyridine latex in RFL compounds on H-test adhesion values

Electronic Pendulum

of curves is useful in predicting the maximum velocity which may be reached before "bottoming," i.e., 100% penetration, will occur.

In Table 3 is tabulated a list of results from measurements upon a number of different foam compounds. Actual formulations and methods of foaming are not given because it was desired to illustrate only the method of indicating and comparing test data. This table serves to illustrate the great range of characteristics which may be differentiated.

Summary and Conclusions

The impact pendulum with electronic instrumentation is a very useful test machine for the evaluation of the shock absorbing properties of foam materials. Time spent in a careful determination of the physical characteristics of the pendulum is well repaid in terms of increased information from the tests performed.

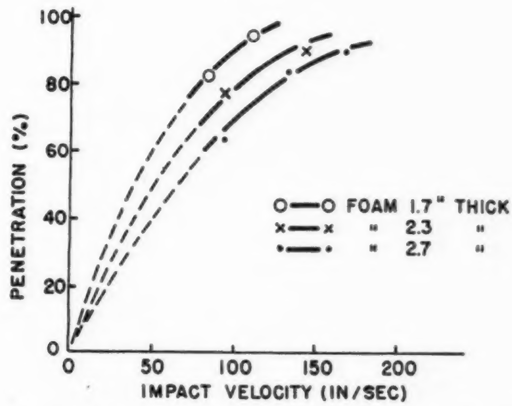


Fig. 10. Hemisphere penetration into polyurethane foam as function of impact velocity

Acknowledgment

The author wishes to thank the Goodyear Tire & Rubber Co. and H. J. Osterhof for permission to publish this work, and S. D. Gehman for valuable suggestions and criticism.

Increased Synthetic Latex Use

Increased use of synthetic rubber latices, which began in 1949, continued during the first part of 1957, according to the Department of Commerce publication, "Industry Report—Chemical and Rubber," for July.

Output of SBR latices this year is expected to exceed 70,000 long tons, dry weight, a new high. The production of neoprene and nitrile latices seems to be leveling off at just over 10,000 tons a year.

MEETINGS and REPORTS

RMA Molded and Extruded Subdivision Program on Technology and Economics

The regular annual meeting of the Molded, Extruded, Lathe Cut & Chemically Blown Sponge Rubber Subdivision of the Mechanical Rubber Goods Division of The Rubber Manufacturers Association, Inc., was held at the Homestead, Hot Springs, Va., June 27 and 28. Seven papers were presented dealing with a variety of subjects ranging from nuclear energy applications in the rubber industry to a discussion of the present economic climate.

Pierce Sperry, Sperry Rubber & Plastics Co., chairman of the Subdivision, presided and was assisted by J. J. Catterall, assistant secretary in charge of the RMA Mechanical Goods Division. A reception was held on the evening of June 27, and the annual dinner on the evening of June 28. There was also a golf tournament on June 27.

Nuclear Energy

"Nuclear Energy Applications to the Rubber and Allied Industries," by Darwin Krucoff, Armour Research Foundation of Illinois Institute of Technology, was the first paper on the program.

Mr. Krucoff pointed out that nuclear energy was of direct interest to the rubber and other chemical process industries in the form of the heat and radiation it could provide. He said it was technically feasible to start with a pound of natural uranium, worth about $20, and in a nuclear reactor convert this material into heat equivalent to that released by burning $7,500 worth of coal. Also, very large quantities of radiation are released, and these constitute a valuable by-product for promoting chemical reactions.

With regard to radiation particles originating in the nucleus or core of the atom, it was explained that alpha,. beta, and gamma particles are increasingly smaller and lighter in the order given. The alpha and beta radiation is primarily of interest for surface phenomena, and the gamma radiation is the type principally considered as a chemical catalyst because of its penetrating power.

The effects of radiation on elastomers were then reviewed, including changes which might take place such as cross-linking, increase in melting point, raising and lowering of hardness, and the gamma-ray vulcanization of rubber.

It was emphasized that the expected impact of nuclear energy on the rubber industry is intimately associated with nuclear reactor development. Reference was made to a study on the application of a promising new type of reactor to a rubber tire plant that would provide heat for steam for vulcanization and also gamma rays to aid in the vulcanization of the tires. Nuclear fuel costs are expected to be competitive in most areas of the United States by 1965, and decrease steadily thereafter. Nuclear plant costs are expected to average about 150% of conventional power plant costs by 1965 and to reach 110% by 1980.

The Purchasing Agent

"The Purchasing Agent and How He Ticks" was the subject of the next speaker, A. M. Kennedy, Jr., Westinghouse Electric Corp.

Mr. Kennedy gave his views on salesmen as seen through the eyes of a purchasing agent. He expressed appreciation of the rubber products salesmen who tried to work with his customers to provide the best service possible in the form of quality products at prices that were fair to both the producer and the consumer. He admitted that some purchasing agents were interested only in obtaining the lowest price possible for a given product, but felt that this method of operation left much to be desired.

Economic Climate

"Our Economic Climate" was discussed by B. A. De Graff, Goodyear Tire & Rubber Co., who said that our economic climate has been favorable to the expansion of the molded and extruded rubber goods industry. The extruded goods business of about $4 million a year in 1941 has expanded to $24 million in 1947, to $49 million in 1954, and to $60 million in 1956, or about 15 times in 15 years. The molded goods business has expanded from $71 million in 1947 to $200 million in 1956, or about three times in 10 years. Molded and extruded goods production, taken together have increased from $95 million in 1947 to $260 million in 1956. (See Table 1.) Prospects are favorable for continued expansion of both molded and extruded goods production and sales, it was said.

TABLE 1. MOLDED AND EXTRUDED RUBBER GOODS PRODUCTION

1947-1956 in $ Millions

Year	Total	Molded	Extruded
1947*	95	71	24
1954*	220	171	49
1956†	260	200	60

*Census of Manufactures.
†RMA estimate.
NOTE: Molded goods include wringer rolls, but exclude sponge and hard rubber. Extruded goods include lathe-cut products, but exclude tubing.

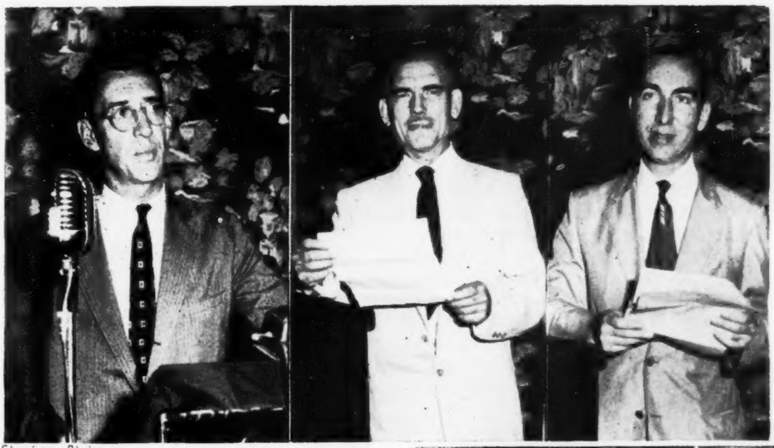
Other major factors important to the economic climate such as population and population changes, employment, industrial production, personal income, retail sales, consumer credit, new plant and equipment expenditures, prices, automobile production, etc., were reviewed.

It was estimated that by 1965 there will be 7,000,000 new households with all that this implies in new houses and household equipment. Industrial production has been increasing year after year, and despite a downturn during the second quarter of this year the trend is expected to reverse itself during the last six months. Real income per capita has been steadily increasing even though the value of the dollar has gone down, and year after year people spend a large proportion of their income for retail sales. Such sales are evidence of peoples' willingness to spend what they have earned, and to the extent they do, we continue to have good business, this speaker declared.

In concluding his talk, Mr. De Graff urged the molded and extruded goods industry to initiate a promotion campaign to impress upon the public the importance and significance of these products to the safety and the comfort of their everyday lives.

Rubber for Aircraft

"Rubber for the Supersonic Air Age" was the title of the talk by J. M. Kelble, Wright Air Development Center. Present-day military aircraft require rubber compounds serviceable at temperatures as low as —80° F. and at extreme high temperatures created by aerodynamic or air friction heating. Further complicating the problem is the necessity of resistance not only to heat, but to various oils, fuels, hydraulic fluids, exotic propellants, and a nuclear environment, it was added.



Stephen Blake

Left to right: **A. M. Kennedy, Jr., who discussed purchasing agents; B. A. De Graff, economic climate; Darwin Krucoff, nuclear energy**

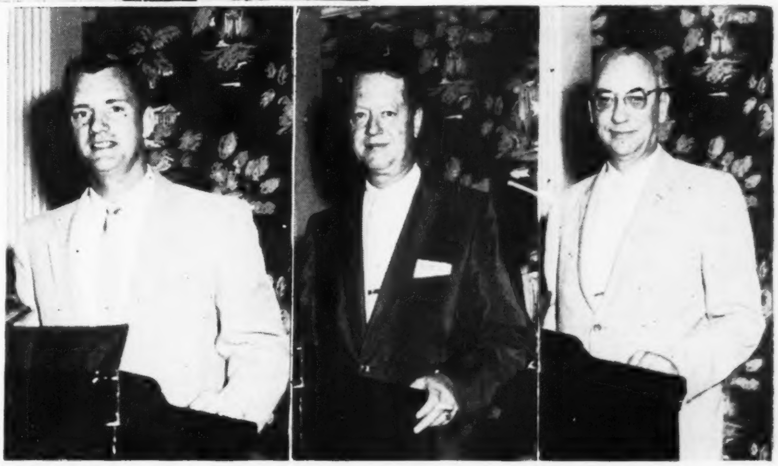
Tires for military aircraft are still considered a major problem. Butyl and silicone rubbers and wire cord have been found to be the best materials for such tires at the present time, and tires will be built which will increase the operational capabilities from the present 250° F. for natural rubber tires to 350 or 400° F. This increase, while significant, is, however, still short of the goal that is desired.

Elastomers resistant to nuclear radiation are another problem, and here natural rubber followed by SBR, nitrile rubber, and neoprene are rated in that order of decreasing resistance. The addition of anti-rads into these compounds increased further their resistance to nuclear radiation.

New polymer development during the past two years has resulted in several promising new elastomers such as Fluoro Rubber 2F4, of Minnesota Mining & Mfg. Co.; Viton A, of E. I. du Pont de Nemours & Co., Inc.; Kel-F 214, of the M. W. Kellogg Co. Division of 3M; and Silastic LS 53, of Dow Corning Corp. These polymers have in some cases both good low- and high-temperature properties in the presence of fuels and hydraulic fluids. Also mentioned was a fluoronated polyester developed by Hooker Electrochemical Co., with a brittle point of —98° F. coupled with very good original physical strength.

Increased emphasis in the future will be placed on new inorganic polymer systems and in the field of heterogeneous catalysis whereby means will be investigated to polymerize promising vinyl monomers which cannot be polymerized by conventional means.

All these efforts have merely enabled us to catch up with the demands of present-day aircraft and missiles. There is already a demand for rubbers which will withstand temperatures in the range of —400 to 1500° F. Close cooperation of government agencies, private industry, and research organizations will be required to reach this goal, Mr. Kelble said in conclusion.



Stephen Blake

Left to right: **J. M. Kelble, who discussed rubber for aircraft; Pierce Sperry, 2000 A.D.; H. C. Dinmore, educational program**

The Year 2000 A.D.

"Utopia for the Molded, Extruded, Lathe-Cut and Chemically-Blown Sponge Rubber Product Manufacturers," by Pierce Sperry, was a review of the history of this branch of the industry from 1957 to the year 2000 A. D.

This speaker first decried the movement of some of these manufacturers in 1957 toward quoting the lowest prices for their products in the face of rising costs. He then reviewed the trends in the direction of extreme liberalism in the 1960's which by 1967 had resulted in a $3-an-hour minimum wage, a 25-hour week, and scheduling of production by labor unions.

By 1972, a manufacturers' union had been formed, and it was mandatory for industry to make a minimum profit of 20%, and many practices of the past such as free samples and free laboratory tests on each batch of stock for customers, accepting orders for large quantities and shipping smaller quantities, and holding parts, manufactured to customers' orders, in the manufacturers' warehouse for several months, were all abolished by law.

In hunting for the real reasons why the manufacturers of 1957 and 1958 could not accomplish some of the things achieved in the late 1900's, the speaker said although they did not lack the desire to make a profit, there was a lack of united effort in the rubber industry at that time to adopt and live by some of the sound policies which they knew should be put into effect.

Cost of Substandard Rubber

W. J. Sears, RMA vice president and chairman of its crude rubber committee, reviewed the work on quality inspection of natural rubber done by the RMA and the Rubber Trade Association of New York over the last several years, which has resulted in the "Type Descriptions and Packing Specifications for Natural Rubber Grades Used in International Trade," issued in February, 1957.[1]

It was again emphasized that the general level of natural rubber quality decreases as the level of natural rubber price increases. When prices are high and differentials between grades wide, an incentive is created for the unscrupulous packer to sell intentionally rubber as a grade higher than it actually is. These malpractices multiply during high-price periods and are not always discovered by the buyer whose inspection methods are inadequate, it was said. In addition, the many reliable producers and packers who market their rubber in conformance to the contract standards abhor these practices and suffer from unfair competition, Mr. Sears said.

Using the figures for non-conformance to RMA standards in 1956 of five grades of natural rubber, it was estimated that with the average price and grade differentials for the month of May, 1957, the annual aggregate compensatory claim on this basis for 1957 from the United States manufacturer of rubber products would be more than $836,000.

Educational Program

H. C. Dinmore, Tyer Rubber Co., reported on the Subdivision's "Cooperative Educational Program," which began a year ago and had as its objective the

[1] Rubber World, Mar., 1957, p. 914.

production of a handbook outlining standards of performance for the manufacture of products of that branch of the rubber industry.[2]

He said that the work on the handbook was practically completed and thanked the technical men and their companies for the time, effort, and financial backing they had contributed to bring the project to a successful conclusion.

Originally the work had a double purpose, that is, to educate, mutually, each other and agree as to concepts of standards of performance and quality, and to provide a means for the customers' purchasing men, engineers, and quality men to specify their needs better in rubber parts so as to receive proper quality at the lowest price.

Mr. Dinmore declared he was positive the first objective has been met, but it was the job of the companies in the industry to sell the handbook and make it a technical bible to their customers.

Chairmen of the working committees singled out for special appreciation were as follows: John Gerstenmaier, Goodyear; Claude Shreiner, Chardon Rubber Co.; Herman Osborn, Stalwart Rubber Co.; and George Sprague, B. F. Goodrich Sponge Products Division.

[2] *Ibid*, Aug., 1956, p. 727.

Plan Isocyanate Symposium

The Upper Midwest Section of the Society of Plastics Engineers, Inc., is sponsoring an Isocyanate Symposium on October 8 and extends an invitation to all SPE members and to the industry to attend this informative conference.

This is another in a series of Regional Technical Conferences designed to bring up to date information on the ever-growing family of plastics materials before industrial leaders as well as to allow interchange of ideas in areas of mutual interest.

The program, to be held at the Curtis Hotel, Minneapolis, Minn., follows: "Recent Advances in Urethane Materials," by C. H. Wilson and W. L. Riedeman, University of Notre Dame, South Bend, Ind.; "A Comparison of Properties between Polyester and Polyether Based Isocyanate Foams," M. J. Sanger, G. T. Gmitter, and E. M. Maxey, The General Tire & Rubber Co., Akron, O.; "Flexible Urethane Foams Derived from Polyethers," S. Davis, J. M. McClellan, and M. C. Frisch, Wyandotte Chemicals Corp., Wyandotte, Mich.; "High-Temperature Urethanes," V. V. D'Ancicco, Carwin Polymer Products, Inc., North Haven, Conn.; "Rigid Urethane Foams," M. D. Bailey and R. C. Kuder, Allied Chemical & Dye Corp., Buffalo, N. Y.; "Molding of Resilient Urethane Foams," R. E. Knox and W. J. Touhey, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; and "Storage Characteristics of a Polyurethane Resin," Joseph G. Fuono, U. S. Naval Powder Factory, Indian Head, Md.

Advanced registrations may be sent to William Brooks, 1839 Carl St., St. Paul, Minn. Registration fee is $4.00. Preprints of talks will be made available.

New York Course Details

Details of the course in "Basic Rubber Technology," to be given by the New York Rubber Group beginning on October 7 at the Engineering Societies Bldg., 29 W. 39th St., New York, N. Y., have been announced by L. C. Komar, Titanium Pigments Corp., chairman of the educational committee of the Group. Enrollment will be limited to the first 200 registrations received, and the fee for the course is $25 for members and $28 for non-members. Registration forms for this course will be mailed in September and should be returned to Mr. Komar at 99 Hudson St., New York 13, N. Y.

The dates for each of the lectures, the subjects, and the lecturer and his affiliation follow: October 7, "Natural Rubber," C. E. Rhines, United States Rubber Co.; October 14, "Styrene-Butadiene Rubber," P. G. Carpenter, Copolymer Rubber & Chemical Corp.; October 21, "Introduction to Compounding," G. Winspear, R. T. Vanderbilt Co.; October 28, "Physical Testing—Compounding for Specific Effects," I. Drogin, United Carbon Co.; November 4 ,"Rubber Processing Equipment—Plant Layout," lecturer from Farrel-Birmingham Co., Inc.; November 18, "Vulcanization," B. S. Garvey, Jr., Pennsalt Chemicals Corp.; November 25, "Reinforcement," C. W. Sweitzer, Columbian Carbon Co., and R. F. Wolf, Columbia-Southern Chemical Corp.; December 2, "Polymer Degradation," G. C. Maassen, R. T. Vanderbilt Co.; December 9, "Reclaimed Rubber," lecturer from U. S. Rubber Reclaiming Co., and "Butyl Rubber," J. L. Ernst, Enjay Laboratories; December 16, "Neoprene and Hypalon," M. A. Schoenbeck, E. I. du Pont de Nemours & Co., Inc.; January 6, "Nitrile and Acrylic Rubbers" G. A. Daum, B. F. Goodrich Chemical Co., and "Silicone Rubber," P. C. Servais, Dow Corning Corp.; January 13, "Thiokol Rubber," J. R. Panek, Thiokol Chemical Corp., and "Isocyanate Rubber," W. G. Ogden, Du Pont; January 20, "Polyvinyl Chloride," M. Bachner, Firestone Plastics Co., and "Polyethylene," E. E. Kimmel, Koppers Co.; January 27, "Latex, Foam, and Sponge Rubber," L. Talalay, Texfoam Division, B. F. Goodrich Co.; February 3, "Principles of Rubber-to-Metal Bonding," D. M. Alstadt, Lord Mfg. Co., and "Tire Compounding and Manufacture," C. J. Glaser, Lee Tire & Rubber Co.

The lectures will take place between 7:30 and 9:45 p.m.

Group's Successful Golf Outing

Fine weather and a record attendance made the annual golf outing of the New York Rubber Group held at the Baltusrol Golf Club, Springfield, N. J., August 1, a very successful affair. A total of 229 members and guests played golf, and there were 275 at dinner when the winners of the golfing prizes were announced.

W. B. Curtis, Naugatuck Chemical Division, United States Rubber Co., had low gross for members and in addition to winning first prize gained possession of the Nesbit Cup for the year 1957. Second and third low gross prizes for members went to H. P. Pryor, R. E. Carroll, Inc., and F. F. Salamon, F. F. Salamon Co., respectively. George Vacca, Bell Telephone Laboratories, achieved high gross for members.

Prizes for low gross among the guests were awarded to E. Ungrady, C. Basilone, and W. Fenwick, in that order; while C. J. Jankowski had the high gross score for guests.

First and second prizes in the putting contest were won by W. Remig and L. Erwin.

Golf-bag raffle run by the club's professional golfer was won by W. J. Sparks, Esso Research & Engineering Co.

L. J. Koch, Westwood Chemical Co., headed the committee in charge of this outing, and B. A. Wilkes, Godfrey L. Cabot, Inc., was the treasurer.

Instrument Symposium Held

A symposium on "Instrumentation for the Rubber and Plastics Industry" was held by the Rubber & Plastics Division of the Instrument Society of America in Cleveland, O., September 12, as part of the Society's twelfth annual Instrument-Automation Conference and Exhibit program scheduled for September 9-12.

David R. Davis, The General Tire & Rubber Co., was chairman of the symposium, the first of its kind ever held by the Society. The keynote address was given by Charles R. Zimmer, president, Industrial Gauges Corp.

Other speakers included Allen S. Powell, Case Institute of Technology; Eugene L. Mleczko, Aerojet-General Corp.; Charles E. Sitz, The B. F. Goodrich Co.; J. L. Cook, Jr., The Ohmart Corp.; and E. Paul Morehouse, The Goodyear Tire & Rubber Co.

Beginning with a discussion of instrumentation and control familiar to the industry, the sessions developed the application of radiation gaging and analytical instrumentation to process control of polymeric materials.

1958 Chemical Show

The tenth National Chemical Exposition, sponsored by the Chicago Section of the American Chemical Society, will be held in the International Amphitheater, Chicago, Ill., September 9 through 12, 1958. Robert J. Reinarts, chairman of the Exposition, has announced completion of arrangements to have the big chemical show during the same week as the 134th national meeting of the Chemical Society in Chicago.

The major portion of the Exposition will be housed in the air-conditioned main building of the Amphitheater, with some displays in the new exhibit hall area. Ample parking space is available on the adjoining grounds, and special chartered buses will be provided to carry ACS registrants between the meeting room and the hall.

Floor plans and a prospectus will be ready for distribution soon from the office of the Chicago Section, ACS.

SORG Lecture Series

The Southern Ohio Rubber Group has announced its 1957-58 lecture series entitled, "The Theory of the Physical and Mechanical Properties of Rubber," which will consist of five lectures and two field trips. The lectures will be held at the Engineers Club, Dayton, O., from 7:30 to 9:30 p.m., beginning October 1. Registration is open to all interested parties, and membership in the SORG is not required. The fee is $5 and should be sent to D. R. Strack, Inland Mfg. Division, General Motors Corp., Box 1050, Dayton 1, O.

"The Rubber-Like State," by Maurice Morton, University of Akron, will be the first lecture on October 1, to be followed on October 22 by "Theory of Vulcanization," by David Craig, B. F. Goodrich Co.; and on November 12 by "Reinforcement by Pigments," by W. R. Smith, Godfrey L. Cabot, Inc.

On December 3, the first field trip will be a tour of the Materials Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.

"Behavior of Rubber under Thermal and Mechanical Stress," by D. L. Loughborough, B. F. Goodrich, will be the next lecture, on January 21, 1958, and the "Theory of Polymer-Liquid Interaction," will be discussed by Maxwell A. Pollack, chemical consultant, on February 11.

The final event will be the second field trip, on March 4, which will consist of a tour of the Inland Mfg. Division.

Rubber Section Program

The program for the meeting of the Rubber Section of the National Safety Council scheduled for the Conrad Hilton Hotel, Chicago, Ill., October 21 and 22, as arranged by C. M. Beck, St. Clair Rubber Co., has been announced.

On October 21, opening remarks and a report on Section activities will be presented by J. L. Dean, Firestone Tire & Rubber Co. R. A. Bullock, Corduroy Rubber Co., will report nominations for officers for 1957-58, and the election of these officers will follow. Ray Hart, Dayton Rubber Co., will then give the report of the statistics committee.

Round-table discussions will comprise the remainder of the program, as follows: "Accident—Cause, Investigation, and Prevention," with Ed Turner, Goodyear Tire & Rubber Co. of Canada, Ltd., conference leader, and G. A. Miller, Gates Rubber Co., recorder; "Health Hazards in the Rubber Industry," with F. W. Sands, United States Rubber Co., conference leader, and N. P. Hunter, Dunlop Tire & Rubber Corp., recorder; "Off-The-Job Safety," with E. R. Gardner, Summit County Ohio Safety Council, conference leader, and S. T. Burrows, Mansfield Tire & Rubber Co., recorder; and "Communications in Safety," with T. J. Cain, B. F. Goodrich Co., conference leader, and N. C. Longee, U. S. Rubber, recorder.

On October 22 there will be a luncheon-meeting, with Jack Kidney, Goodyear, as master of ceremonies. "Human Factors in Safety" will be discussed first in the afternoon, after which there will be reports by the conference leaders on the round-table discussions of October 21.

Polyethylene Symposium

The Society of Plastics Engineers, Inc., will devote its regional technical conference, to be held October 17, at the Hotel Carter, Cleveland, O., to the properties and uses of polyethylenes.

The morning session, with W. O. Bracken, of Hercules Powder Co., as moderator, will include the following papers, with emphasis on properties:

Introduction and History of Polyolefins, by J. K. Honish, Bakelite Co.

Low-Density Polyethylene, R. M. Campbell, E. I. du Pont de Nemours & Co., Inc.

Medium-Density Polyethylene, F. C. Sutro, Jr., Spencer Chemical Co.

Linear Polyethylene, G. H. Sollenberger, Koppers Co.

Luncheon speaker will be Bill Veeck, baseball promoter.

F. A. Martin, Hoover Co., is the scheduled moderator for the afternoon session, featuring uses of polyethylene, as in the papers below:

Blow Molding, by E. E. Mills, consultant.

Injection Molding, Milan Krajcik, Wooster Rubber Co.

Pipe Extrusion, Herbert Fackler, American Valcathene Corp.

Film, C. J. B. Thor, Visking Corp.

Advance reservations may be sent to E. J. Haskins, Zenith Plastics Co., 3901 Superior Ave., Cleveland 14, O. The registration fee of $9.00 includes luncheon and preprints. Checks should be made payable to Cleveland-Akron Section, SPE.

Temple Technology Course

The Bureau of Industrial & Special Services of Temple University, Philadelphia, Pa., has announced that a course in Rubber Technology will be given beginning on September 17, 7:30 to 9:30 p.m., and continuing for 12 consecutive Tuesdays at the Community College Center, Cheltenham Ave. and Sedgwick St. The fee for the course is $45, and registration is through the Bureau mentioned above also at Cheltenham and Sedgwick.

A. L. Back, consulting chemist and chemical engineer, and a specialist in the field of rubber technology, will conduct the course. Mr. Back was chief chemist with American Foam & Rubber Corp. and has served in various industries in the Philadelphia area as a rubber chemist.

Subjects to be covered include terminology, natural rubber, diene elastomers, other elastomers, rubber-like plastics, reclaimed rubber, processing, vulcanization and vulcanization agents, antioxidants, reinforcement, softeners, plasticizers, extenders, physical testing, etc.

SPI Contest, Conference

"Quality Vinyl Products in the Consumer Field" will be the theme of the next Plastics Film, Sheeting & Coated Fabrics Division Conference of The Society of The Plastics Industry, Inc., to be held December 10 and 11 at the Hotel Commodore, New York, N. Y. New developments and industry advances of pertinent interest to vinyl film fabricators and processors will be featured.

The first nation-wide contest on finished products fabricated from vinyl film and sheeting will be sponsored. Entries of vinyl products will be judged chiefly on the basis of styling, workmanship, and functional value. Merchandising, packaging, and retail value aspects of each product, however, will be a part of the judges' consideration.

A panel of stylists, designers, and merchandisers will serve as the judges. Categories in which products may be submitted are: rainwear, shower curtains, draperies, closet accessories, kitchen ensembles, inflatable items.

Products submitted for this contest will be on display during the two-day conference at the Commodore Hotel and should be sent directly to SPI headquarters, New York, completely identified and with retail selling prices included. The contest closes October 31.

The chairman of the Conference program committee is J. Roy Price, merchandising manager, Bakelite Co., Division of Union Carbide Corp., New York, and the Fabricators' Contest committee chairman is J. P. Frank, Presto Plastic Products Co., Inc., New York.

Chicago Golf Tourney

The Chicago Rubber Group's annual golf outing, at Medinah Country Club, Medinah, Ill., attracted a record attendance of about 400 members and guests.

This highly successful affair was due to the efforts of the committee consisting of: chairman, Frank E. Smith, Williams-Bowman Rubber Co.; assistant chairman, E. F. Wagner, Witco Chemical Co.; H. R. Spielman, Witco; Dwight Smith, Cary Co.; Maurice O'Connor, O'Connor & Co.; Wm. Lussie, R. T. Vanderbilt Co.; Harold Stark, Ted Biell, and John Groot, Dryden Rubber Division; Geo. Smith, Williams-Bowman; E. W. Lines, Union Carbide & Carbon Corp.; R. Huhn, Harwick Standard Chemical Co.; A. E. Laurence, Phillips Chemical Co.; and John Porter, Russell Harrington Cutlery Co.

Among the prize winners were: low gross—J. T. Adams, Sears-Roebuck & Co., and F. Kozek, Inland Steel Container Corp.; long drive—E. Ziny, Servicized Products Corp., A. Gabrial, Brummer Seal Co., M. Langford, Union Carbide, and D. Woodhead, Central Rubber Co.; and closest to the pin—B. Yunker, Chicago Rawhide Mfg. Co., and E. Osborne, Caterpillar Tractor Co.

The assemblage enjoyed either a lobster or roast-beef dinner, and everyone present received a door prize, whose sum total retail value approximated $3,000, thanks to the generosity of 138 companies.

Plan Synthetics Symposium

A symposium designated "Life with Synthetics" will be held on the date of the annual meeting of the Association of Consulting Chemists & Chemical Engineers, Inc., October 22 at 2:15 p.m. at the Belmont Plaza Hotel, New York, N. Y. The symposium is open to industry representatives and all others interested. Letterhead reservations with remittance of $15 per person must be received by the Association, 50 E. 41st St., Rm. 82, New York 17, N. Y., before October 17.

The program includes: "Synthetic Organics—Present and Future," by H. F. Mark, Polytechnic Institute of Brooklyn; "New Synthetics for Better Health," with Erwin Di Cyan; "Plastics of Today and Tomorrow," Irving Skeist; "Synthetic Dyestuffs and Fibres," Eugene W. K. Schwarz; and Carl C. Mattman, textile fabric consultant, who display synthetic textiles, with running comments.

Also there will be experiments, displays, and take-home samples. There will be cocktails and a banquet. Ladies are welcome. The meeting is informal.

The annual meeting, for Association members only, will be held the same date and place, preceding the symposium.

More Research Papers

An additional 1,500 research papers from the Government's Synthetic Rubber Program have been released to industry through the Office of Technical Services, United States Department of Commerce, Washington, D. C. The papers cover work done from July 1, 1949, through April 30, 1955.

The papers were prepared by research contractors participating in the synthetic rubber research and development program conducted under the Federal Facilities Corp. and its predecessor agencies. The entire collection is on deposit at the Library of Congress on microfilm or photocopy.

Prices for individual reports will be furnished on request by the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C. All inquiries should refer to PB 126248.

An index to the reports is also available from the Library. Its price is $11.10 for microfilm copy, $82.80 for enlargement print. The newly released collection supplements about 4,000 other papers on the copolymer project released previously. The Library will also quote prices on earlier reports.

Philadelphia Group Outing

The Philadelphia Rubber Group's annual outing, at the Manufacturers Golf & Country Club, Oreland, Pa., August 16, had a record attendance of 325 members and guests. The sporting events enjoyed by the gathering consisted of a golf tournament, swimming, horseshoe pitching,

(Continued on page 872)

CALENDAR of COMING EVENTS

September 18-20
National Bureau of Standards, Catholic University of America, Applied Physics Laboratory of Johns Hopkins University. Symposium—"Formation and Stabilization of Free Radicals." National Bureau of Standards, Washington, D. C.

September 23-25
American Society of Mechanical Engineers. Fall Meeting. Hotel Statler, Hartford, Conn.

September 26
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

September 27
Ontario Rubber Group. Field Day. Dundas Golf & Country Club, Dundas, Ont., Canada.

September 30-October 5
ISO/TC 45. Seventh Meeting. Zurich, Switzerland.

October 1
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

October 4
New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Detroit Rubber & Plastics Group, Inc.

October 8
Buffalo Rubber Group.
Upper Midwest Section, SPE. Isocyanate Symposium. Curtis Hotel, Minneapolis, Minn.

October 10
Northern California Rubber Group.

October 11
Chicago Rubber Group. Furniture Club, Chicago, Ill.

October 17
Cleveland-Akron Section, Society of Plastics Engineers. Regional Technical Conference on Polyethylene. Hotel Carter, Cleveland, O.

October 18
Boston Rubber Group. Hotel Somerset, Boston, Mass.

October 21-22
Rubber Section, NSC. Conrad Hilton Hotel, Chicago, Ill.

October 22
Assn. of Consulting Chemists & Chemical Engineers, Inc. Annual Meeting and Synthetics Symposium. Belmont Plaza Hotel, New York, N. Y.

October 24
Southern Ohio Rubber Group.

October 25
Akron Rubber Group. Sheraton-Mayflower, Akron, O.

October 25
Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.

November 5
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

November 7
Rhode Island Rubber Club.

November 14
Northern California Rubber Group.

November 15
Chicago Rubber Group.
Connecticut Rubber Group.

November 15-16
Southern Rubber Group. Peabody Hotel, Memphis, Tenn.

December 1-6
American Society of Mechanical Engineers. Annual Meeting. Hotel Statler, New York, N. Y.

December 2-6
Exposition of Chemical Industries. Coliseum, New York, N. Y.

December 3
Buffalo Rubber Group. Christmas Party.

December 5
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

December 6
Detroit Rubber & Plastics Group, Inc. Christmas Party.
Northern California Rubber Group.

December 10-11
Plastics Film, Sheeting & Coated Fabrics Division, SPI. Conference. Hotel Commodore, New York, N. Y.

December 13
Boston Rubber Group. Christmas Party. Hotel Somerset, Boston, Mass.
Chicago Rubber Group.
The Los Angeles Rubber Group, Inc. Christmas Party. Ambassador Hotel, Los Angeles, Calif.
New York Rubber Group. Christmas Party. Latin Quarter, New York, N. Y.

December 14
Southern Ohio Rubber Group.

January 7
The Los Angeles Rubber Group, Inc. Biltmore Hotel, Los Angeles, Calif.

January 24
Akron Rubber Group. Sheraton-Mayflower, Akron, O.

February 4
The Los Angeles Rubber Group, Inc.

February 13
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

NEWS of the MONTH

Washington Report and Industry News Summary

. . . A full-scale investigation of the tire manufacturing industry by a Senate subcommittee is under way, based on a feeling by certain Senators that the Federal Trade Commission was lax in enforcing Federal laws aimed at unfair and illegal marketing practices.

. . . The Federal Trade Commission is itself critical of some tire advertising and appeared certain to ask the tire industry to cooperate in making certain changes in such advertising.

. . . Synthetic rubber and many basic rubber products are excluded from lower tariff rates now being applied to many imported items as a result of the implementation of the Customs Simplification Act which was passed in 1956.

. . . Shipping rates on natural rubber from the Far East appear to be stabilized following an agreement between 12 shipping lines, including three American companies, acceptable to the Federal Maritime Board.

. . . Price increases of from 2% to 6% on tires and other rubber products by three of the Big Four rubber companies prompted URWA President L. S. Buckmaster to suggest that the recent 15¢-an-hour wage increase could have been absorbed without price increases. Denials from Goodyear and Goodrich were immediately forthcoming.

Washington Report

By ROBERT E. L. ADAMSON

Senate Probes Tire Industry Marketing Practices; FTC Studies Tire Advertising

Rubber tires occupied "center stage, front" in August, with major developments emerging from Congress, the Federal Trade Commission, and the Pentagon. Not necessarily in order of their importance, they were:

- A full-scale Congressional probe of the tire manufacturing industry gathered steam and headed for public hearings early this fall, centering chiefly on Senatorial charges that the FTC has been lax in enforcing federal laws aimed at unfair and illegal marketing practices.
- At the same time, FTC put its staff to work on the purportedly growing problem of tire advertising, and the Commission appeared certain to ask the tire industry to cooperate in a clean-up scheme.
- The Army Ordnance Corps announced the perfection of an all-synthetic, heavy-duty truck tire made of butyl rubber. Ordnance officials said they envisioned "resulting independence from natural rubber imports" and substantial savings from the very much reduced rate of deterioration in storage of these butyl tires, but said they had no plans to order any.

Tire Industry Probe

The Congressional investigation of the tire industry, vis-a-vis law enforcement by the FTC, will be conducted by the Senate Subcommittee on Retailing, Distribution, and Fair Trade Practices, headed by Senator Hubert Humphrey, volatile Minnesota Democrat. The investigation was assigned to Humphrey by the chairman of the parent Small Business Committee, Senator John Sparkman, small business champion.[1] The probe was scheduled after the FTC case had been thrown out of the Federal Appeals Court here for technical errors in drafting a quantity-discount rule on tires and tubes. He called the defeat for FTC the "most notable" example of continuing failure to get an antitrust conviction in the tire industry.

Humphrey quickly set his subcommittee's staff to work on the new investigation and made it clear that he agrees with Sparkman that (1) there are unfair marketing practices in the tire industry, and (2) the FTC has been lax in correcting them.

In a letter to a St. Paul tire dealer and director of the Minnesota branch of the National Tire Dealers & Retreaders Association, Humphrey described the situation as he sees it and indicated what his subcommittee intends to do about it. He called it an investigation into "the causes underlying the FTC's poor performance in eliminating unfair marketing practices from the rubber tire industry," then he added:

"In the Subcommittee investigation being planned, particular emphasis will be placed upon finding out why the Commission failed so miserably in prosecuting the 'quantity limits discount' case, one of the most important anti-trust actions ever brought in the rubber tire industry. I feel that Congress should know whether the failure in the case resulted from statutory deficiency; or, rather, from a lack of enforcement determination on the part of the Commission itself.

"You may be assured that I will keep you and your Association fully informed of all progress made in the investigation. Already, the preliminary investigation work by the staff has begun and, I believe, will be completed by the end of the summer. Then, members of the Subcommittee will sit down, review the staff reports on the matter, and try to work out some dates for public hearings that will be convenient to everyone. Public hearings will not have to be lengthy since the Subcommittee will have already collected most of the information necessary for its judgment."

Meanwhile, the Humphrey investigation

[1] RUBBER WORLD, July, 1957, p. 563.

received the hearty applause of Senator James E. Murray, Montana Democrat, in a speech on the floor of the Senate. The Montanan said he had been trying to force tire manufacturers to get out of the tire retailing business for 15 years, when the Senate Small Business Committee first warned of "a most serious situation . . . regarding the control exercised by the big concerns in that industry to monopolize the distribution field. . . ."

A "divorcement" bill, having the effect of outlawing tire sales by anybody but an independent tire dealer, has been introduced in every Congress since 1942 by Senator Murray. This year's version was opposed by the Department of Justice because it would allegedly tend to curtail competition, foreclose new manufacturers of tires from retailing their products even where this means was the only practicable one, and force taxi owners, truckers, and other large buyers to deal with small suppliers who might not be able to give them quantity discounts.

"Although the Department of Justice recognizes the problems to which this bill is directed," A Department spokesman declared, "the question arises as to whether these problems cannot be solved by some less drastic measure than the complete divorcement proposed."

These arguments were rejected by Murray, who said he was "more convinced now than ever before of the need" of his divorcement bill.

Meanwhile, the FTC staff continued to work in two areas of the tire industry problem: (1) what course to take in view of its defeat in the quantity discount case; and (2) how to deal with mounting complaints of misleading advertising. Since the Commission had already decided not to appeal the adverse quantity-discount decision, it could either rewrite its discount rule in line with the decision, initiate an entirely new investigation on the necessity of having a rule at all, or simply drop the whole problem.

Tire Advertising

On the second question, misleading advertising, the FTC staff was working hastily on a "cease fire" program which the industry would be asked to accept voluntarily while the Commission took long-range steps to curb the mounting confusion over what consumers were getting when they purchased new tires. A Commission spokesman said the staff itself was having difficulty finding out what was meant by "first, second and third line" tires and tires described as "100, 200, or 220." He summed up the picture this way:

"We think there's quite a good deal of correction needed in the current advertising of auto tires."

He complained that second-and third-line tires were being advertised as first-line; that outmoded treads were being described as current; and that tires touted as "original equipment", i.e., purchased for new cars by the auto manufacturers, were not accompanied by the names of the new cars allegedly using them as original equipment.

He also made it clear that the Commission had been in touch with many in the tire industry who would like to see

Completion of cure of all-butyl military truck tire at Pennsylvania Rubber Co. plant

the false advertising problem cleared up. It was this sign of eager cooperation in some areas of the industry that apparently has influenced the FTC to seek a voluntary solution from the entire industry.

The alleged violations involved are subject to federal penalty under Section 5 of the Federal Trade Commission Act. This is the so called "catch-all" section which covers a multiplicity of sins, including false advertising. As in the case of tire discounts, the Commission may take any one of three courses: (1) investigate some of the advertised claims and issue complaints against the purported wrong-doers; (2) get together with the tire industry on a set of "trade practice rules" (these are already in use by the marketers of plastics and other commodities); or (3) prepare a set of specific conditions under which advertising would be proper, in terms industry would understand.

Army Butyl Military Tires

The Department of the Army has announced that all-butyl rubber, heavy-duty truck tires in the most widely used type in the Army, size 9.00 by 20, have passed Ordnance Corps cross-country and road tests and that these tests have shown the new butyl tires to be at least equivalent or superior to military tires presently being manufactured. These tires were perfected after more than three years of research by the Pennsylvania Tire Co. division of the Mansfield Tire & Rubber Co., and Esso Research & Engineering Co.

Officials of Army Ordnance said these are the first tires made wholly from mass-produced synthetic rubber which have passed the Army's rigid tests. Vehicle tires, military and commercial, are now being made with a combination of styrene-butadiene, SBR, rubber or 100% natural rubber.

It was emphasized also that butyl tires gave promise of vast savings in the defense program and assure this nation of independence from natural rubber imports since the new tires do not deteriorate in storage as the present types do.

The butyl rubber is compounded with improved modifying agents which increase resiliency, resulting in lower heat generation; while at the same time butyl rubber tires virtually eliminate ozone cracking and deterioration and strongly resist chipping, particularly in the tread area.

The development of a butyl latex dip, which permits satisfactory bonding of butyl rubber to the tire cord, enables the tires to be made on conventional rubber plant tire manufacturing equipment and is of special importance. A program is currently under way to develop 100% butyl tires in the 14.00 by 20 and 24.00 by 25 earthmover types, as well as even larger than 9.00 by 20 military truck tires.

Rubber Products Excluded from Customs Simplification

The U. S. Treasury Department, in August, took a negative, but, nevertheless, first step toward simplifying tariff procedures and possibly lowering tariff rates on thousands of foreign produced commodities which enter the United States market. While negative in the sense that it named the items to which new procedures will *not* be applied, it was a positive and warmly welcomed move for the American manufacturers of synthetic rubber and more than a dozen basic rubber products and their scores of variations. These include rubber footwear, catheters, combs, gloves, hose and tubing, insulating material, matting, packing, tires and tubes (except for bicycles), and gutta percha tissue. Also exempt from the new tariff rules were hundreds of chemicals.

The rubber and chemical items were carried in a 30-page list of imported commodities to be excluded from the provisions of the Customs Simplification Act, enacted a year ago after years of negotiation on how best to streamline the U. S. customs system. The list issued by the Treasury Department was preliminary in that domestic manufacturers may petition the Department to add other items to the list. Department experts estimated that it will be well into 1958 before a final and probably expanded list will be ready.

The multitude of imported products not included in this final version will come under the new formula, and, in effect, it will be a little easier to export to the U. S. and, possibly, a little cheaper. The new formula uses, for tariff figuring purposes, the "export value" of a foreign item, which is the equivalent of the whole-sale value placed on a product in the competition for the U. S. market. Under the old formula, the tariff assessors were required to use the higher of either the "export value" or the "foreign value" as the wholesale value in pricing a product to compete in the market where the item is produced (at home).

Customs officials will no longer have to use the higher of these two values. Thus, since the effect of the new formula will be generally lower dutiable values, Congress decided to put a floor in the simplification measure to give domestic manufacturers

some measure of protection from foreign goods. It directed the Treasury Department to afford manufacturers protection by excluding from the new formula any item whose value would decline by more than 5%. Synthetic rubber and the other goods listed in the August manifesto, therefore, will continue to enter the country under the old rules.

The interesting process by which the Treasury and its Bureau of Customs arrived at the preliminary list of items which would continue to qualify for full tariff protection was arrived at in the following manner. After approval of the 1956 act on August 2, 1956, the Department and the Customs began a thoroughgoing study of imported commodities as to which the duty in fiscal year 1954 was dependent on the value of the commodity. This study covered 2,599 commodity numbers or classifications, and the starting point was an original survey prepared for Congress in 1955 and 1956 covering imports of these commodities in fiscal 1954. The original 20,000 samples contained in the survey prepared for Congress were supplemented by more than 6,000 additional samples in cases where it was felt that more information was needed on the subject.

Domestic manufacturers seeking to add their products to the list of items excluded from the new Customs Simplification Bill formula will be given 60 days to supply Treasury with their reasons. Subsequently, the preliminary list as amended will be published as a final list. Thirty days later, next year some time, all articles not named in the final list will be appraised for the first time under the new law.

Shipping Rate War Averted

Twelve steamship companies serving the Far East rubber trade finally agreed to a "share-the-cargo" formula which is acceptable to the Federal Maritime Board in this country and which at least one of the 12 thinks is absolutely essential to prevent a freight-rate war in that area. The agreement, submitted to the three-man FMB in August, provides that the three United States companies involved shall carry at least 34.5% of the rubber moving from Thailand to the United States.

Only six months ago an executive of American President Lines, one of the trio involved, warned the FMB that the arrangement as then worded had narrowly averted a rate war among the steamship companies transporting rubber from all Far Eastern producing areas to this country and Europe. The FMB refused to accept the first draft, but its objections were met in the final version of the agreement filed in August.

The one-third plus reserved for American bottoms is a substantial comedown from their share four years ago, however, when they enjoyed more than half of the Thailand-U. S. movement of rubber. During 1953 the entry of a Japanese line into this trade for the first time since World War II precipitated a rate war which lasted until the pooling arrangement was set up and killed the threat of a spread to the other rubber ports in the Far East.

APL and the other American lines concerned were willing to take a cut in cargo movement to reestablish stability and prevent instability from growing. All lines in the trade raised their freight rates twice after the pool was created; while under rate war conditions freight charges decline as lines compete for cargo.

In addition to APL, signatories to the agreement were Isthmian Lines, Lykes Bros. SS Co., Barber Fern-Ville Lines, Blue Funnel Line, Hoegh Line, A. P. Moller-Maersk Line, Mitsui SS Co., Prince Line, Holland-American Line, North German Lloyd, and S. M. Nederland.

Disposal of Akron Lab to Firestone Completed

Attorney General Herbert Brownell, Jr., gave a routine anti-trust release to the sale of the Government's Akron Rubber Laboratory and Pilot Plant in August, and they went over to private ownership for the first time since they were built in 1943. The purchaser, neighboring Firesone Tire & Rubber Co., took over the property at a price of $760,000.

This bid had to be cleared by not less than three government agencies, however, before it was finally accepted. They were the General Services Agency, which conducted the bidding through its Chicago office and recommended the sale to Firestone to the White House; the Budget Bureau, which gave price clearance as the financial and policy arm of the White House; and Mr. Brownell, who had to establish that the government was not contributing to a monopoly or anti-trust complication by making the sale to the Firestone Company.

Though drawn-out over a year, the Akron facilities disposal program was fairly routine except for the unusual provision requiring GSA to offer them to other government agencies, then place them on sale regardless of the response to this interdepartmental survey. Of the more than 20 agencies canvassed, only the Department of Agriculture expressed any interest. Even then, its response practically guaranteed a sale to private industry because Secretary of Agriculture Ezra Benson estimated it would cost $1 million to equip the facilities for farm product research. In view of this, he recommended to Franklin Floete, GSA chief, that any industry offer approaching $1 million be accepted. Obviously, Mr. Floete thought Firestone's $760,000 was close enough.

Industry News

Union-Company Statements in Wage-Price Controversy

Price increases on tires and/or other rubber products by Goodyear Tire & Rubber Co., B. F. Goodrich Industrial Products Co., and United States Rubber Co., ranging from 2% to 6%, were announced during August. The price increases were made necessary by recent increases in the costs of labor, materials, and transportation, it was said.

L. S. Buckmaster, president of the United Rubber Workers of America, AFL-CIO, in a special statement said that the big rubber companies could have absorbed the recent 15¢-an-hour wage increase without raising prices. He said the wage increase does not mean added production costs because productivity has been going up, and the companies are getting more output for each hour that is worked.

He added that the negotiated wage increase is not causing inflation, but that the "administered" price policy definitely is. By "administered" price policy he said he meant raising the price of a product to any desired level, considering only how much profit a company wanted to make.

R. S. Wilson, executive vice president of Goodyear, pointed out in reply to the Buckmaster statement that Goodyear reduced its prices on automobile tires to the renewal trade on January 1, 1957, by about 6% and that the 3% increase on August 1 left the list price on these tires still lower on the average than they were a year ago.

Goodrich in a letter to URWA members and all salaried personnel not represented by the URWA said that the union president ignored the fact that wages and other employe benefits represent one-third of the company's sales dollar and that other material and service costs have increased substantially as the 1957 wage increases "snowball" throughout American industry. Wage increases for all Goodrich personnel increase the company's annual employment costs about $15 to $16 million, and these coupled with other increased costs are not covered by the announced price increases.

The company disagreed also with the Buckmaster statement that it was in favor of "administered" prices, that is, adding a standard amount of profit to its costs of manufacturing. If "administered" prices were possible, distressed operations which are losing money would not exist, nor would Goodrich have to go out of business

in product lines unless they became obsolete, the company added.

In connection with the Buckmaster contention that his union was trying to "catch up" with a decent standard of living, Goodrich said that tire prices since 1948 have increased 55%, the cost of living has gone up 20%, and wages and benefits to URWA members have increased 84%.

Nylon in Tires

Almost one tire in every four produced in 1957 for passenger and truck use will be made with nylon cord, according to estimates by the tire merchandising section of E. I. du Pont de Nemours & Co.'s textile fibers department. This prediction was based on current tire production levels, projected by consideration of nylon yarn requirements of tire manufacturers for the remainder of the year.

Indicative of the rapid progress of nylon in tires was the finding that 40% of all replacement passenger tires will be made with nylon cord in the current year, a dramatic increase over the 25% forecast as recently as February, 1957.

Total number of castings for the current year is expected to be some 110 million. Of these, more than 20 million will be nylon cord replacement passenger tires in volume and premium levels. Approximately five million nylon cord tires will be manufactured for original equipment use and for trucks. Aircraft and heavy off-the-road tires have already adopted nylon as the standard cord.

Nylon cord tires are already standard equipment on some car models and optional factory-installed equipment on some other models. Significant expansion in the availability of nylon cord tires as factory-installed equipment is expected with announcement of specifications for the 1958 model year.

High-Energy Blowing Agent

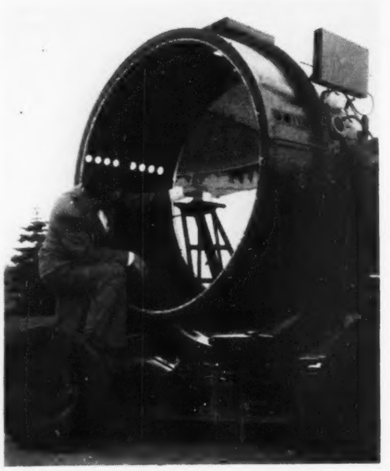
Kempore R-125, a new powerful blowing agent for rubber and plastics, has been developed by Natural Polychemicals, Inc., Wilmington, Mass. The new chemical is based on hydrazine and, when properly compounded in rubber, is believed to provide the highest nitrogen efficiency of all hydrazine-derived blowing agents on the market both here and in Europe. The production of Kempore R-125 involves new techniques that provide a high-energy level in the finished blowing agent.

Kempore R-125 is non-toxic, is safe to handle, and will not support combustion. It produces odorless, non-staining, non-discoloring closed-cell sponge of low density and with an extremely fine and uniform cell structure, it is further claimed. This material is now in commercial production.

A technical bulletin on the product is available.

A new modern plant, emphasizing automation in operation and design, is now under construction to take care of the anticipated demand for Kempore and other organic chemicals.

BFG Uses Solar Furnace for High-Temperature Tests



Roger W. Strassburg, of BFG Research, showing approximate area where sample test material will be placed in Solar Furnace

B. F. Goodrich Research Center, Brecksville, O., is utilizing the sun and a U. S. Army surplus searchlight in a research program in high-temperature materials. The first facility of its kind in the rubber industry, the searchlight permits testing materials at temperatures which are as high as 6300° F.

As explained by Frank K. Schoenfeld, BFG vice president—research—the facility, known as a Solar Furnace, enables scientists to harness the sun's rays and concentrate their intense heat in a spot about ¼-inch in diameter. Its chief value is its ability to create a clean heat since solar heat rays are a clean, pure source of energy with no undesirable elements of various furnace materials present. The high temperature is reached only at the center of the sample, and there can be no reaction between the material and the container.

To concentrate the sun's rays on the sample the mechanism inside the searchlight that holds the sample is carefully placed at the point where the rays, bouncing back off the light's parabolic mirror, cross at the focal plane, where the intense heat is concentrated.

A special device enables the operator to move the sample holder by remote control during tests. An electronic guiding system is employed to keep the furnace trained on the sun. Temperature control is maintained even at the highest temperature by off-focus operation and by a shielding cylinder.

One-quarter-inch samples can be tested in this Solar Furnace. Dr. Schoenfeld further declared that such physical properties as heat transmission, specific heat, melting point, and others can be measured without any difficulty.

Newcomb-Detroit Co. Purchased by DeVilbiss

The DeVilbiss Co., Toledo, O., has announced an agreement to purchase Newcomb-Detroit Co., Detroit, Mich., a pioneer in the design, manufacture, and installation of custom-built, industrial finishing equipment. Newcomb-Detroit will remain a corporate entity and be operated as a subsidiary of DeVilbiss.

"With the facilities of Newcomb-Detroit we will have, by far, the largest sales volume in the preparation, painting and finishing equipment field. . . . We will have a greater scope and variety of equipment and facilities, plus additional engineering and research," President Howard P. DeVilbiss said.

Newcomb-Detroit designs, manufactures, and installs industrial ovens, heavy-duty waterwash spray booths, parts washers, dust collectors, and a wide variety of kindred equipment. In addition to custom installations, the company also furnishes individual units.

These products supplement and complement the DeVilbiss line of spray-painting and finishing equipment for industry and will henceforth be marketed through DeVilbiss's international sales organization.

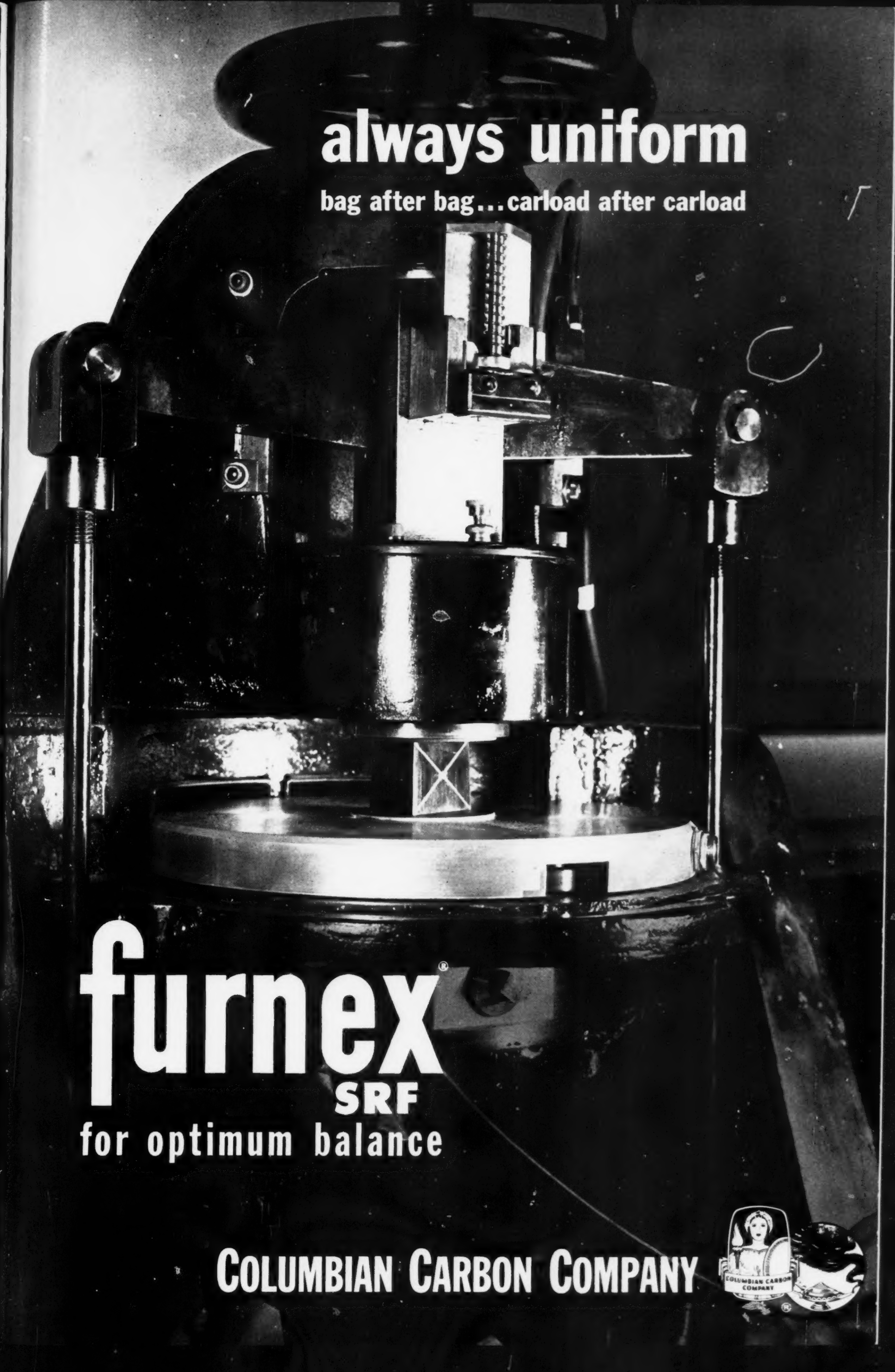
E. G. Holt Honored at Retirement Party

Everett G. Holt, the Commerce Department's "Mr. Rubber" for almost four decades, was honored by more than 50 government and industry officials at his retirement party in Washington in August. He stepped down from his post with a round of kudos after a 36-year career dating back to 1921.

Mr. Holt was assistant director for rubber of the Chemical & Rubber Division, Business & Defense Services Administration, when he retired on June 30. He was guest of honor at a two-hour cocktail party emceed by Lowell Kilgore, deputy director of BDSA's Chemical & Rubber Division.

After accepting a book of personal tributes written by several score associates in government and industry, Mr. Holt was saluted by H. B. McCoy, head of the BDSA, and W. James Sears, vice president of The Rubber Manufacturers Association, Inc., and head of its Washington office. Mr. McCoy paid tribute to Mr. Holt's outstanding reputation with the rubber industry in this country and with the natural rubber producers abroad. He had just returned from a meeting of the International Rubber Study Group held in Indonesia.

Mr. Sears said that Mr. Holt had made a great contribution to the rubber industry through two war periods and, in peacetime, through the dissemination of statistical data and comment on rubber industry trends over many years.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Goodyear Opens Plant

The opening of its new $1-million tread rubber plant has been announced by the Goodyear Tire & Rubber Co. The plant manager of the Chehalis, Wash., installation is Robert W. Jenkinson.

The Goodyear facility, first of the company's 22 domestic plants to be devoted entirely to the production of tread rubber, has excited considerable interest in the Pacific Northwest. It is the first plant to be built in the new industrial park developed by the City of Chehalis.

Housing a semi-automatic production line capable of producing 30,000 pounds of tread rubber daily, the plant can be expanded to meet increased needs. At present, tread rubber can be produced and shipped to order within 24 hours.

A modern one-story framed structure of cement block and glass, the Goodyear facility is 240 feet long and 80 feet wide. It embraces a floor area of approximately 22,000 square feet, of which 5,000 square feet are devoted to finished product storage.

Johnson's New Prexy

Heading the list of several management changes at the Johnson Corp., Three Rivers, Mich., is the appointment of W. R. Monroe as president. Formerly executive vice president, he succeeds R. O. Monroe, who now becomes chairman of the board.

R. W. Gottschall, formerly sales manager, is now vice president in charge of sales.

T. O. Monroe has been made secretary-treasurer of the Johnson Export Corp., and vice president of Johnson-Hamstra, of Weesp, Holland, which will manufacture Johnson joints for European markets (except France).

Johnson Corp. manufactures: rotary pressure joints for admitting steam or liquids to rotating machine parts, such as on paper and textile machinery; direct-operated solenoid valves; "Instant" water heaters; and allied steam specialties.

W. R. Monroe




L. J. Reizenstein R. W. Ostermayer, Jr. P. O. Powers Jack L. Wilson

New Veeps at PICCO

The announcement of the elections as vice presidents of Jack L. Wilson, R. W. Ostermayer, Jr., P. O. Powers, and L. J. Reizenstein has been made by Pennsylvania Industrial Chemical Corp., Clairton, Pa. Along with vice president F. W. Corkery and president R. W. Ostermayer, Sr., they will constitute the executive staff.

This staff will integrate the new facilities with PICCO's existing production plants at Chester and Clairton, Pa., and coordinate new product research with application and development of new product uses in the firm's diverse fields of activity.

Wening RW Assistant Editor

Richard E. Wening has joined the staff of RUBBER WORLD as an assistant editor. Mr. Wening was graduated from Ohio State University in 1954 with a B.S. degree in chemistry. He served in the U. S. Army during 1955 and 1956 and had been employed as a technologist in the physical chemistry and corrosion technology division of Battelle Memorial Institute prior to joining RUBBER WORLD.

Mr. Wening had also been employed for a short period during his college years by the Inland Mfg. Co. Division of General Motors Corp. He is a member of Phi Gamma Delta.

Richard E. Wening

Polychemicals Expanding

National Polychemicals, Inc., Wilmington, Mass., manufacturer of organic chemicals for the rubber, plastics, and related industries, is building a new plant to produce special organic chemicals, which is the third plant unit constructed in Wilmington since the concern moved there in 1953.

The firm also has appointed Joseph P. Flannery sales manager. He formerly served as administrative assistant, which post now goes to Robert F. Gosselin.

Jean H. Nesbit, special sales representative for National Polychemicals, has been advanced to Midwest district manager, with headquarters in Buffalo, N. Y. At one time he was president of U. S. Rubber Reclaiming Co., Inc., and of the Rubber Reclaimers Association.

Hugh W. Gillon, Jr., has been named sales representative in the Midwest territory. He previously had been a rubber chemist with Castle Rubber Co.

Charles B. Riley, Jr., has joined National Polychemicals as chemist.

New Du Pont Product

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., fabrics division has announced the availability for testing of fabrics coated with a new synthetic rubber. "Viton" A fluoroelastomer, claimed to possess remarkable resistance to deterioration by heat, chemicals, aircraft, and automotive fuels as well as lubricants.

An addition to the line of "Fairprene" elastomer-coated fabrics, the new material will withstand total immersion in most fluids at temperatures above 300° F., a resistance previously unknown in rubber products. "Viton" A coated fabrics are almost impervious to ozone and weathering.

The initial market is expected to be in the aircraft industry as diaphragm and gasketing material. The new fabrics may be found useful in automotive and mechanical fields as well as in the construction of fuel cells, equipment linings, protective clothing, and elsewhere where chemical resistance is a problem.

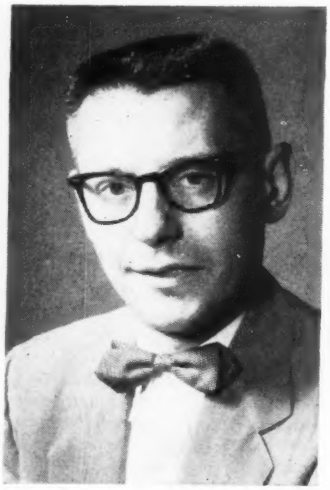
Three "Fairprene" coated fabrics made with "Viton" A are offered: coating of "Viton" A on glass fabric, coating of "Viton" A on fabrics of Dacron polyester fiber, and coating of "Viton" A on glass fabric which is coated with Teflon tetrafluoroethylene.

Vanderbilt Ups Two

R. T. Vanderbilt Co., New York, N. Y., has transferred Ogden B. Samler from the New Jersey sales territory to the home office where he will assist in matters concerning technical sales and service of rubber chemicals. Prior to his position as technical sales representative, Samler had been for several years a chemist and compounder at the company's rubber laboratory in East Norwalk, Conn.

Thomas J. Farley had been named by Vanderbilt technical sales representative to cover Philadelphia, New Jersey, the New York metropolitan area, and southern Connecticut. For the past two years he was a chemist and compounder at the East Norwalk laboratory and prior to that time had worked in rubber compounding and development at Essex Rubber Co., U. S. Rubber Reclaiming Co., and United States Rubber Co.

Ogden B. Samler



Thomas J. Farley

New BFG Elastomer

A new synthetic rubber said to be capable of withstanding both sub-zero cold and temperatures higher than its own vulcanizing point has been developed by B. F. Goodrich Aviation Products, Akron, O. The composition of the rubber has not been revealed.

The first use of the new material is in a lightweight, flexible membrane manufactured by Goodrich as part of the fueling system for Boeing Airplane Co.'s Bomarc area defense missile, according to P. W. Perdriau, general manager of Goodrich Aviation Products.

Used as a coating for a nylon fabric diaphragm, the material flexes without cracking at -40° F. Even in high temperatures generated by the missile in flight, the material remains flexible and does not stick to itself or to the metal fuel tank in which it is mounted, Perdriau said.

The rubber is not affected by the jet fuel in which it is immersed and resists deterioration caused by fungus growth and humidity under tropical conditions, lending it to applications in all climates, it is further claimed. Facilities of Goodrich's new fuel-cell testing and development laboratory in Los Angeles were used to test the new material.

More Titanium Chlorides

The New Jersey Zinc Co., New York, N. Y., has announced the availability in multi-pound quantities of titanium dichloride and titanium trichloride, considered promising catalysts for isotactic polymerization of unsaturated hydrocarbons such as ethylene, propylene, and butene.

The products, lower in valence than the often-used titanium tetrachloride, are more active catalysts. The company now expects an acceleration in the development of improved plastics through isotactic polymerization.

Both materials are free-flowing, dark-purple crystalline powders. They are available through the metal division of New Jersey Zinc.

TBA Department Expanded

Seiberling Rubber Co., Akron, O., has expanded its accessories and repair materials department which now will handle sales of tire retreading and repair materials, batteries, and other accessories and will include also the functions of the company's former diversified products department.

A. W. Schwab heads the enlarged department, replacing F. P. Watt. Schwab is a former Seiberling employe who recently returned to the company. During his earlier service he managed the firm's sales and service laboratory and the mileage sales department.

Watt has joined Sidles Co., Omaha, Neb., distributor of Seiberling products. He will manage a newly created retreading plant for the organization, which distributes automotive parts and home appliances in Nebraska and Iowa. While at Seiberling he had been employed in the sales and service laboratory and in the service department as well as in the accessories and repair materials department.

USI Polyethylene Technique

The technical service department of U. S. Industrial Chemicals Co., New York, N. Y., is recommending nitrogen blanketing of polyethylene extruder feed to minimize oxidation. The procedure is said to help solve such problems as gels, fisheyes, dark spots, and similar effects of polyethylene oxidation.

The procedure was first tried at the Tuscola, Ill., headquarters of the technical service laboratory for U.S.I.'s Petrothene polyethylene resins. While any inert gas, such as argon or helium would be acceptable, nitrogen was chosen because of its low cost.

The easiest way to exclude oxygen is to establish and maintain an inert gas blanket over the resin entering and inside the machine, the company says. As a further refinement, the gas can also be used to blanket the molten polyethylene as it leaves the extruder. This practice reduces build-up of oxidized material on the die lips of the extruder. The same principle is applicable to other methods of processing polyethylene, such as molding.

New Veeps at Enka

American Enka Corp., manufacturer of rayon and nylon, last month created a new division of marketing, headed by John L. Bitter, formerly vice president for research and development, but now vice president, marketing.

C. Chester Bassett, Jr., general sales manager, has been elected vice president, sales. He started with the company in 1953 as special assistant to the president for sales and new product development.

Frits Prakke, technical assistant to the president, has been elected vice president, manufacturing, to succeed Martin Wadewitz, now technical vice president and head of a newly combined research and engineering division.

Robert B. Armstrong, assistant to the president, has been made assistant vice president, manufacturing, and transfers from the New York office to the plant at Enka, N. C.

Carl R. Dolmetsch, manager of business development, has been appointed also assistant to the president.

Nuclear Worker Glove

Charleston Rubber Co., Charleston, S. C., has created a nuclear products division to sell a newly developed protective glove for use by scientists and workers in the nuclear energy field and in bacteriological experimental work.

The shoulder-length glove is made of a neoprene composition. Called Dry Box Protective Glove, it is said to have been two years in the developing. The company is a manufacturer of rubber protective gloves and sleeves for high-voltage and industrial workers.

The company has just completed a $100,000 expansion program, and a second such program is scheduled to begin later this year.

New Continuous-Flow Process for Silica Gel

American Industrial Chemical Co., Cooper Park, Butler, N. J., a division of Amerace Corp., recently was organized to produce silica gel, hydro gel and silicates. The company's plant has been designed around a unique production system said to be the first continuous-flow process for silica gel. One section of the plant is devoted to rapid continuous production of large quantities; while a second section is equipped for efficient production of smaller quantities or special formulations.

American Industrial is an affiliate of American Hard Rubber Co., another Amerace division. The latter, a major user of silicas for more than 20 years and a producer of silicas, has contributed many improvements to their production.

Among the properties typical of the silicas now available from AICC are: particle size from three mesh to submicron; bulk density from four to 50 pounds per cubic foot; moisture absorption up to 77% by weight; and surface area up to 800 square meters per gram.

The company also can supply silicates as potassium silicate and ethyl silicate.

Uses for silicates include: anti-sticking agents for plastic films; "carriers" for catalysts; dessicants for dehydrating packages, liquids, gases, etc.; anti-caking agents for hygroscopic materials; and flattening agents for paper and textiles.

Opens Valve Testing Lab

Sinclair-Collins Valve Co., Akron, O., recently completed new design and testing laboratory facilities, equipped with the latest in precision measuring and evaluating devices, as part of the company's expansion program. Since standard commercial test stands were not sufficiently versatile to meet the company's needs, much of the new equipment has been developed, designed, and custom-built by or for Sinclair-Collins.

The new facilities include a high-pressure air, steam, oil, and hot water test room. Various field conditions can also be simulated. Electronic equipment includes a special oscilloscope for measuring high-speed phenomena.

Sinclair-Collins manufactures a complete line of ½- to three-inch NPT medium and high-pressure diaphragm-operated control valves for a wide variety of uses.

Vansul Plastic Colors

Vansul Corp., Englewood, N. J., manufacturer of color dispersions for the rubber industry, has expanded its line to include color dispersions for the production of plastics. The new colors are said to be of uniform shade, heat stable, and light fast.

The company is offering a newly published plastic color chart showing 28 available colors in five different types of color concentrates for vinyl, polyester, polyurethane, and polyethylene compounding.

International Department For Huber's Foreign Trade

Peter Schoenburg

Louis A. Lara

J. M. Huber Corp., New York, N. Y., according to President Michael W. Huber, has organized a new international department to handle all the company's foreign business, and it will be responsible for the marketing of Huber carbon blacks, clays, inks, rubber chemicals and pigments, as well as licensing of Huber processes throughout the world, except for the United States and Canada. This independent department, directly responsible to Michael Huber, will be headquartered at the home offices, 100 Park Ave., New York.

Peter Schoenburg, director of export for Huber, heads the new department. Its other executives include: Louis A. Lara, export sales manager, who was formerly general sales manager of Huber's ink division; Carlos L. Herman, manager, sales service, formerly the ink division's export manager; and Henry H. Graebner, manager of export orders. Fred S. Thornhill continues as technical representative stationed in Paris.

Neoprene Gasket Sealant For Airport Glass Panes

A neoprene gasket has been used as a sealant for the thousands of glass panels that were used in the construction of New York City's new International Airport Arrivals Building now nearing completion.

The building is a three-story structure, 1,760 feet long, 415 feet deep, with two double-deck fingers 240 feet long. It is completely enclosed with glass panels of various kinds and sizes and was said to have called for one of the largest single glass contracts in the history of the United States construction industry.

A special neoprene gasket was developed by the architect, Skidmore, Owings & Merrill, in association with E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Pawling Rubber Corp., Pawling, N. Y., which manufactured the gasket; and several glass companies.

The gasket, prefabricated to the architect's specifications in the Pawling plant, has vulcanized corners. At the construction site, it was snapped around the pane by a single workman. A movable stop applied pressure to the gasket, providing a uniform, permanent seal between the glass and the aluminum frame.

The resiliency of the neoprene allows the glass to bend under heavy wind loads, reducing breaking possibilities. This resiliency also allows the gasket to absorb thermal expansion and contraction of the glass skin walls. Pawling says the cost of the gasket is about half that of conventional top-quality sealing methods.

Lighter Truck Rim

A lightweight truck rim said to weigh eight to 12% less than most standard rims has been announced by Firestone Steel Products Co., Akron, O. Called the Firestone Challenger two-piece rim, it meets all the requirements of The Tire and Rim Association, the company says.

The rim, intended for tubed tires, was developed through a strengthening of high stress points and the lightening of low stress points and was released after extensive road tests, according to Firestone.

The rims, when mounted as duals, allow approved spacing between units and can be used with tire chains. Only one of the two pieces is required to be removed when a tire is changed.

New Jefferson Division

Jefferson Chemical Co., Inc., Houston, Tex., has combined its market research division and sales research and development division into a new group, the commercial development division, marketing department, which will handle all functions of product development and market research including product diversification and development of new sales.

John J. Glover, manager of market research since 1955, heads the new division. He has served in various positions since joining Jefferson in 1949.

Gallup Survey for D&A

The average American's reaction to the words—vinyl, acrylic, and alkyd—plastic resins used in paints, was measured recently in a Gallup survey conducted for Dewey & Almy Chemical Co., division of W. R. Grace & Co., Cambridge, Mass.

The chief results follow:

A majority of adult Americans (61%) recognized the word vinyl and can name at least one product made of it (53%); while more than a third (37%) can recall such special vinyl qualities as durability, ease of cleaning, and flexibility.

Few (18% each) said they have heard of acrylic or alkyd, and less than half of these were able to mention products or characteristics.

Latex, a broad term used to describe a wide range of water-thinned paints, including vinyls and acrylics, drew 70% recognition and strong association with rubber products, durability, and elasticity.

Correction

In a story on page 610 of the July, 1957, issue and in connection with the purchase of tire manufacturing machinery from England by Russia, it was stated inadvertently that the English manufacturers succeeded in obtaining this order "in face of competitive bids by the United States, France, and Germany."

American engineering and machinery builders are not allowed to build and ship equipment for Russia or the satellite countries by order of our State Department.

Dayton Foam For Packaging

Dayton Rubber Co., Dayton, O. is ready to make available to electronics equipment manufacturers the liquid components, technical advice, and foaming equipment needed to comply with a U. S. Navy authorization providing for the use of resilient, rigid, and semi-rigid urethane foams as a packaging material for safer shipment of fragile electronic parts and instruments.

Electronics equipment makers may use Poly-Koolfoam materials in many ways, including foaming-in-place, prefoamed around models, or by molding in forms.

Poly-Koolfoam is the Dayton Rubber trade name for the type of urethane foam materials specified in the U. S. Navy authorization for use in the packaging of electronic products.

Firestone Fellowship Award

The Firestone Fellowship, a $1,500 award granted annually to encourage young people in the study and research of rubber chemistry, has been awarded for the second time to Russell Livigni, the son of Andrew Livigni, a final inspector at The Firestone Tire & Rubber Co., Akron, O. The fellowship is awarded on the basis of high scholarship and an understanding of professional laboratory techniques.

Add to Darlan Facilities

An expansion which will triple the existing semi-works facilities for the production of Darlan dinitrile fiber at the Avon Lake Development Center of B. F. Goodrich Chemical Co., Cleveland, O., was announced last month by John R. Hoover, company president.

Primary purposes of the expansion are to provide additional quantities of the new textile fiber for an accelerated market evaluation program and to obtain additional design data for possible production units.

Work on the expansion is already underway, and completion is slated for early 1958.

Plan Research on Lithium

American Lithium Institute, Princeton, N. J., in an effort to amass new technical information on the role of lithium and its compounds in polymerization reactions, will sponsor a research program for this purpose at Princeton University. The project will be under the direction of Prof. Arthur V. Tobolsky, Department of Chemistry, who is wlll known in the field of polymer research In the project, lithium and its compounds will be used experimentally as initiators and modifiers in vinyl polymerization and copolymerization. An extensive study will be made of the rates, molecular weights, and copolymer compositions of these materials.

News Briefs

The Timken Roller Bearing Co., Canton, O., a leading manufacturer of tapered roller bearings, launches its first network television program on September 23 at 9:30 p.m., EDT, over the NBC network, with a documentary, "Eleven against the Ice," the story of the building of the Antarctica Turnpike. Timken's second hour-long spectacular, scheduled for 10:00 p.m. EST, November 21, will be "The Innocent Years," which documents the Teddy Roosevelt and pre-World War I era in American history.

B. F. Goodrich Chemical Co., Cleveland, O., has leased a three-story building adjoining its general offices on Euclid Ave. in order to expand its headquarter facilities. The structure will house the Cleveland district sales offices, engineering groups, a textile application laboratory and other offices.

The Goodyear Tire & Rubber Co.'s four-inch-wide midget tires normally used as enclosures for glass ash trays are being employed at the Los Angeles Children's Hospital as a patient's headrest during a presurgical procedure.

Advance Solvents & Chemical Corp., no longer a corporation, has moved to 500 Jersey Ave., New Brunswick, N. J., where it is now known as Advance Solvents & Chemical Division of Carlisle Chemical Works, Inc.

Foam King, Inc., New York, N. Y., is manufacturing open-cell vinyl foam particularly suited for electronic heat sealing to cloth or vinyl sheeting. Called No. 738, it is available in a variety of heat and light stabilized pastel colors, in densities from 6½ pounds per cubic foot, and in thicknesses from 1/16-inch.

C. J. Sargent's Sons Corp., Graniteville, Mass., designer and manufacturer of industrial and chemical processing dryers and specialized machinery, has appointed "Ike" Farley, Alpha Engineering Co., Houston, Tex., as its sales engineering representative for the central and southern Texas and Gulf Coast areas.

Marbon Chemical Division, Borg-Warner Corp., Gary, Ind., on August 1 put into effect a general price reduction, representing a savings of 3¢ a pound, for its high styrene reinforcing resins, which include "8000" for standard usage; "8000-E" for standard usage, but electrical grade; "8000-A", the low flux temperature type; and "8000-AE," the low flux temperature type, electrical grade.

Enjay Co., Inc., New York, N. Y., has announced that Enjay Butyl 035 is now available in a non-staining grade designated Enjay Butyl 065.

Argus Chemical Corp., Brooklyn, N. Y., is celebrating its tenth anniversary. The company is the developer and manufacturer of Mark stabilizers and Drapex plasticizers. It also does extensive research in the development of products to solve customers' special vinyl formulation problems.

Marblette Corp., Long Island City, N. Y., has announced availability of Maraset resin #341, a lead-filled epoxy formulation, developed to facilitate all industrial applications requiring a high-density casting compound. Its effectiveness, it is claimed, has been demonstrated in providing a barrier against radiation, spurring its use in constructing shields for nuclear installations and containers used to ship radioactive materials.

Thiokol Chemical Corp., Trenton, N. J., is marketing dichloroethyl formal, a chemical intermediate used in the production of synthetic rubber, dyestuffs, pharmaceuticals, plasticizers, and resins. In addition to use as a chemical intermediate, this material is finding use as a solvent in applications of neoprene and other chlorinated compounds. Dichloroethyl formal has excellent paint removing characteristics and may be used as a high-boiling solvent in printing ink and coatings applications. Technical data may be obtained by writing the company.

B. F. Goodrich Chemical Co., Cleveland, O., has announced that its development facilities at Avon Lake, O., called "Experimental Station" have been redesignated "Development Center" in order to express more clearly the basic purpose of these activities.

Chas. Pfizer & Co., Inc., Brooklyn, N. Y. has acquired Morton-Withers Chemical Co., Greensboro, N. C., it was announced jointly by Joseph R. Morton, president of Morton-Withers, and John E. McKeen, president of Pfizer. Pfizer is a leading producer of antibiotics and of vitamins, pharmaceutical specialties, industrial chemicals, and products for animal health and nutrition. Morton-Withers, which produces chemical specialties for the petroleum, rubber, and plastics industries, will be operated as a subsidiary of Pfizer, with no changes planned in management or personnel. Mr. Morton will continue as president, and John P. Withers as vice president.

Gulf Oil Corp., Pittsburgh, Pa., will build a 30 million-gallon-a-year benzene plant at its Port Arthur, Tex., refinery. Expected to be completed late in 1958, the facility will also produce "substantial" amounts of toluene. Benzene is used in the manufacture of styrene.

Seiberling Rubber Co.'s Seilon, a polyvinyl chloride, is being used by Westerville (Ohio) Industries to produce a new plastic air scoop cover. Inserted into the open nose of North American Aviation's jet fighter planes, the air scoop covers keep insects, dirt, and debris out of the jet engines of fighters being serviced or quartered on the ground.

Wellco-Ro-Search, Waynesville, N. C., has been visited by executives of Grulla, S.A., a company affiliate in Colombia, South America, for the purpose of discussing the possibility of a joint venture in forming a shoe manufacturing firm in Mexico.

Sun Rubber Co., Barberton, O., recently licensed Reinische Gummi und celluloid Fabrik, Mannheim, Germany, manufacturer of celluloid and hard plastic dolls, to use Sun's patented system of rotational casting to produce vinyl toys in West Germany. The Barberton firm has licensing agreements also with toy makers in Canada, Mexico, Brazil, and South Africa.

Pennsalt Chemicals Corp., Philadelphia, Pa., has named Mexico Refractories Co., Houston, Tex., distributor of Pennsalt's corrosion engineering products in Texas, southern Arkansas, and western Louisiana.

Minnesota Mining & Mfg. Co., St. Paul, Minn., last month opened a new branch office and warehouse at 12200 Brookpark Rd., Cleveland, O., which has about double the space of the firm's previous facilities at 12430 Elmwood Ave. R. L. Rustad is branch office manager. The company previously had opened another new office and warehouse at 4835 Para Dr., Cincinnati, O.

Nuclear Systems, a division of The Budd Co., Philadelphia, Pa., on August 1 reduced the price of cobalt 60 sources sold commercially for research, development, and industrial applications of radioactive materials. The cut ranges from 50 to 70%. Cobalt 60 is used primarily for research studies on the effects of radiation on such materials as rubber, plastics, and chemicals, among others. It is also widely used for industrial radiography and thickness gaging.

Monsanto Chemical Co., St. Louis, Mo., has changed its block "M" trade mark by substituting a hand-lettered Gothic-type face for a hand-lettered Roman type. The change will enhance the readability and recognition of the trade mark, the company explained.

B. F. Goodrich Industrial Products Co., plastic division, Marietta, O., announces that a quick coupling which can be assembled and disassembled in seconds has been developed from high-impact Koroseal polyvinyl chloride pipe. The new coupling is recommended for temporary chemical, oil, water, or disposal lines. To install, one merely pushes the grooved end of the pipe into the coupling until the thrust ring seats in the groove, it was explained. To disassemble, one sets a disassembly tool in place and simply pulls the pipe out of the coupling.

The Dri-Dux Co., Lodi, N. J., is making available a chemical release coating for such sticky materials as synthetic rubber, adhesives, tar, pitch, asphalt, and resins. The coating incorporates silicones made by Union Carbide Corp.

Minnesota Rubber & Gasket Co., Minneapolis, Minn., recently reported that its Quad Ring (registered trade mark) has been adopted by Hanna Engineering Works, Chicago, Ill., as the sealing element for its Flo-Set speed control valves because of cost reduction, improved design, and reliable performance. The Quad Ring, with its quadrilateral cross-section, has four lips to increase the efficiency over the two sealing surfaces of the conventional O-ring. Effective as a reciprocating and as a rotary seal, Quad Ring was found by Hanna to be equally effective as a static seal in the Flo-Set valve application.

News About People

Clifford A. Neros has advanced to group leader in the product development section of the central research department, Diamond Alkali Co., Painesville, O. He will continue to direct laboratory work relating to product evaluation and applications research on new chemicals and plastics. **James L. Foster** is now group leader in silicate research for Diamond's silicate, detergent, calcium division and will be responsible for development of new silicate products and will also be concerned with maintenance and improvement of quality control standards at Diamond's silicate plants.

Frank E. Eden has been promoted to the development and service department of Emery Industries, Inc., Cincinnati, O., and will be concerned with the market development of new chemical products as well as with technical service for the company's fatty acids, fatty esters, organic acids, lubricant esters, and plasticizers. He has been in Emery's control laboratory since 1953.

D. P. Johnson, D. L. Peters, and **R. C. Wise** have joined the development department of Union Carbide Chemicals Co., Division of Union Carbide Corp., New York, N. Y. Prior to joining Carbide, Johnson was an insecticide chemist with the North Carolina Department of Agriculture; while Peters did post graduate work at M.I.T., and Wise served three years in the navy.

A. L. McMullen has been elected vice president in charge of production, and a director, of Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont. McMullen, an 18-year employe of the parent company at Akron, replaces **James W. Ansley,** who has resigned.

Walter L. Jones has been advanced to manager of the industrial tire sales department of the Goodyear Tire & Rubber Co., Akron, O. He succeeds **E. D. Doyle,** transferred to the Des Moines, Iowa, district as assistant district manager-wholesale.

Camera Associates, Inc.

William J. Burke

William J. Burke has been appointed director of sales for Texas-U.S. Chemical Co., New York, N. Y. He joins the company from The Texas Co., where for the past two years he served as assistant division manager of industrial sales for the Minneapolis division.

Harold W. Burkett, treasurer, U. S. Rubber Reclaiming Co., Inc., has been reelected secretary of the Buffalo (N. Y.) Control of the Controllers Institute of America, New York, N. Y. The following have been elected directors of Institute local controls in their respective areas: **Bruce E. Esterly**, controller, Cooper Tire & Rubber Co., Findlay, O. (Toledo Control); **Wm. E. Flack**, controller, Acushnet Process Co., New Bedford, Mass. (Boston); **Lewis F. Jolly**, treasurer, Armstrong Rubber Mfg. Co., Des Moines, (Iowa); and **Claude A. Pauley**, comptroller, Firestone Tire & Rubber Co., Akron, O. (Cleveland).

C. T. Robertson has been promoted to district manger for the Chicago sales office of Columbia-Southern Chemical Corp., Pittsburgh, Pa. Formerly assistant district sales manager in New York, N. Y., Robertson succeeds **I. G. Stewart**, who will continue in an advisory capacity until his retirement in December.

Joe F. Culp has been placed in charge of the new Kansas City, Mo., field office of Lord Mfg. Co., Erie, Pa., which will provide sales and engineering service on vibration and shock control problems to Missouri, Colorado, Nebraska, Kansas, and New Mexico. Culp joined the company in 1953 in its West Coast office as a field engineer.

James Dunne, who has had more than 18 years' experience in the chemical and associated industries, has joined United Carbon Co., Inc., Charleston, W. Va., as sales representative in the Midwest regional sales office at Chicago, Ill. He had previously been with C. P. Hall Co. of Chicago and Phillips Petroleum Co.

Perry Odell, division purchasing agent for the United States Rubber Co., New York, N. Y., will serve as chairman of the rubber division of Travelers Aid Society of New York's fifty-second annual fund drive.

Charles R. Metz, Jr., has been appointed controller of the Rubatex Division of Great American Industries, Inc., Bedford, Va. He joined the company earlier this year after having served with The Firestone Tire & Rubber Co. as a cost analyst.

J. Michael Billane has been appointed president and treasurer of Dunlop Tire & Rubber Corp., Buffalo, N. Y., succeeding **Glenn H. Crawford**, who has retired because of ill health. Mr. Billane was most recently overseas sales manager for the British parent company. Mr. Crawford continues with the firm as a director and consultant.

J. Michael Billane

George Cornell

George Cornell has been named vice president in charge of yarns and special fabrics for Callaway Mills, Inc., New York, N. Y.

Fabian Bachrach

John N. Hart

John N. Hart has been appointed controller of The B. F. Goodrich Co., Akron, O., succeeding **H. V. Gaertner**, who has retired after 41 years of service with the company. **Glen H. Sengpiel**, director of employe relations in B. F. Goodrich Tire Co., succeeds **Mr. Hart** as director of employe relations in the parent company.

George Strutz now is sales representative in the Akron, O., office for Enjay Co., Inc., New York, N. Y., where he will assist in the sale of Enjay Butyl and Vistanex. Mr. Strutz most recently was development engineer for Columbia-Southern Chemical Corp., Barberton, O.

W. P. Metcalf, purchasing agent for the National Carbide Co. division of Air Reduction Co., Inc., New York, N. Y., has been made assistant purchasing agent of the parent company. With the company since 1942, Metcalf has handled purchasing for National Carbide since 1944.

W. A. Raimond has been named technical director of the engineering and construction division of American Cyanamid Co., New York, N. Y. **Glenn S. Watson** has been appointed technical director of the company's organic chemicals division, a position previously held by Dr. Raimond. Dr. Watson was formerly resident technical director for the company's Marietta and Willow Island plants.

James B. Irwin has been appointed manager of petroleum sales for the Lion Oil Co. Division of Monsanto Chemical Co., at El Dorado, Ark.

R. L. Hockley, a consultant in the chemical industry, has been elected a director of Amoco Chemicals Corp., Chicago, Ill., and will devote much of his time to study and counsel on all management matters at Amoco, including particularly development and marketing. Among his previous positions were vice president of Olin Mathieson Chemical Corp. and president of The Davison Chemical Co.

William S. Muney, Richard A. Goldsby, and **Harry O. Hehner** have joined the organic chemicals division of Monsanto Chemical Co., St. Louis, Mo. **L. Edward Klein** and **David T. Mowry** have been upped from section managers in the division's development department to assistant directors.

John J. Parks has joined Seiberling Rubber Co., Akron, O., as staff engineer.

E. J. Boebinger has joined American Hard Rubber Co., division of Amerace Corp., as manager of its Akron, O., plant. He succeeds **Kenneth J. Durant,** who has retired due to ill health.

Donald C. Hay has been appointed section manager, new product development, B. F. Goodrich Aviation Products, Akron, O. He was previously section manager in the raw materials division.

Alexander F. Durand, since 1956 director of sales training at The General Tire & Rubber Co., Akron, O., has assumed the added responsibilities of manager of new distribution for the company.

Jerome T. Coe last month was made manager of marketing for the silicone products department of General Electric Co., Waterford, N. Y., to succeed **T. C. Ohart,** now general manager of the company's insulating materials section. Most recently assigned as sales manager, Coe has been associated with the silicone operation since 1946.

A. B. Chadwick has been appointed director of manufacturing for Velsicol Chemical Corp., Chicago, Ill., and will supervise the manufacture of the company's insecticides, hydrocarbon resins, solvents, and other chemical products at its plants in Marshall, Ill., and Memphis, Tenn. Since 1939, Chadwick has filled supervisory and executive chemical manufacturing positions with Allied Chemical & Dye Corp., Pennsylvania Coal Products Co., and Koppers Co., Inc.

A. B. Chadwick

Elbert S. Latimore has been advanced to sales promotion manager of the elastomer chemicals department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., succeeding V. A. Cosler, retired. Mr. Latimore, with the company since 1945, has served successively as advertising manager for the former rubber chemicals division of the organic chemicals department (1946); advertising manager of the polychemicals department (1952); and advertising group manager of the pigments and polychemicals departments (1956).

Willard Stewart, Inc.

Elbert S. Latimore

James P. Okie

A. L. Geisinger, vice president and general manager of the plastics division of Diamond Alkali Co., Cleveland, O., since 1953, will retire on December 31 after 38 years with the firm. He will continue as vice president until that date, but the general managership of the plastics division now goes to **James P. Okie,** assistant general manager for the past six months. Okie gained his 24 years' experience in the petroleum refining and chemical processing industries with Shell Oil Co., Shell Chemical Co., and Olin Mathieson Chemical Corp.

Samuel Riker, Jr., for several years treasurer of The New Jersey Zinc Co., New York, N. Y., has been elected also secretary of the firm to succeed the late Walter R. Anyan.

Ward G. Fulmer has been named sales representative of Seiberling Rubber Export Co., a division of Seiberling Rubber Co., Akron, O. He succeeds **Colin Ford,** who has resigned.

William D. Benson, since 1949 vice president in charge of sales for Industrial Rayon Corp., Cleveland, O., has resigned. He has been associated with the synthetic fiber industry for the past 32 years.

O. O. Royer, since 1956 marketing manager for Parker Appliance Co., Cleveland, O., has been advanced to assistant general sales manager. He joined the company in 1945.

Robert A. Brown has been appointed to the newly created post of vice president, general sales manager of Borg-Warner International Corp., Chicago, Ill. He started with the corporation in October, 1951, as controller, was elected treasurer in 1952 and a director in March, 1957.

Thomas M. O'Neil, Jr., formerly vice president in charge of sales and marketing for Heyden Chemical Corp., recently was made general manager of sales for Petroleum Chemicals, Inc., New Orleans, La., which manufactures butadiene and is currently completing a plant which will produce 100,000 tons a year of synthetic ammonia, also a large plant for the production of ethylene.

Frank D. Andruss, formerly vice president and general sales manager of General Latex Corp., last month was elected president of Alco Oil & Chemical Corp., Philadelphia, Pa. He had also served as head of the latex department of Charles T. Wilson Co. and, during the Korean hostilities, as chief of the latex branch, rubber division, General Services Administration.

Frank D. Andruss

Milan G. Kosan has been named assistant sales manager of Koylon mattresses at United States Rubber Co. He has been with U. S. Rubber since April, 1950, and will be located in its Mishawaka, Ind., plant.

W. Earle Henderson has been named marketing director for the rubber division of the Sun Rubber Co., Barberton, O. He was formerly vice president in charge of marketing for Pretty Products, Inc., Coshocton, O., since 1946. Henderson joins Sun as part of a new program to expand the company's present volume of business, assuming the responsibility for originating new and interesting rubber products for a wide range of markets.

Lawrence M. Baxt has joined the colloidal dispersions department of Columbian Carbon Co., New York, N. Y., as chief chemist. Dr. Baxt, formerly with Underwood Corp., will be headquartered at the company's Tacony plant, Philadelphia, Pa., where he will be in charge of newly completed laboratories for technical service, quality control, and development.

Lawrence M. Baxt

A. K. Hoge

Edwin H. Ahlefeld, Jr., has been appointed sales manager in charge of sales and engineering of processing machines for the rubber and plastics industries for Farrel-Birmingham Co., Inc., Ansonia, Conn. He joined the company in 1945 as a senior sales engineer, was named manager of Banbury mixer sales in 1950, and became assistant general sales manager in 1955.

Edwin H. Ahlefeld, Jr.

M. E. Wendt has been appointed manager of chemical materials and product development for The Goodyear Tire & Rubber Co., Akron, O. In this position Wendt will be directly responsible for the development of new products, new applications and field and production service in the chemical materials and products phase of Goodyear activities. He will be responsible to H. R. Thies, general manager of the chemical division, on all matters pertaining to the development of high polymer resins, rubbers, and latices.

T. K. Seiberling, general manager of the shoe products division at Seiberling Rubber Co., Akron, O., has celebrated his 35th year with the company. He is the son of the late C. W. Seiberling, cofounder of the rubber company with his brother, the late F. A. Seiberling.

A. K. Hoge has been appointed special representative for the Boston office of the chemical division of Goodyear Tire & Rubber Co. He will service rubber and plastics processing companies in the New England area.

Edwin A. Norris has been advanced to general manager of The General Tire & Rubber Co., Marion, Ind., division. He had previously been associated with Standard Products Co. as general manager and with the Acushnet Process Co. as factory manager.

Kenneth R. Parker, manager of market research, B. F. Goodrich Chemical Co., has become president-elect of the Chemical Market Research Association.

Edward L. Carlson, advertising manager of Oakite Products, Inc., New York, N. Y., has been placed in charge of the company's informational efforts, including industrial trade shows and trade paper advertising and publicity, in the industrial cleaning and metal finishing fields. Mr. Carlson, who joined Oakite in 1924, was promoted to advertising manager in 1947.

Bruce S. Galbraith has been named eastern district sales manager for the Polyco-Monomer Department of the Borden Co.'s chemical division, New York, N. Y. For the past six years he had been southwest regional sales manager for the Nuodex Products Division of Heyden-Newport Co., Elizabeth, N. J.

Karl N. Carter has been appointed vice president of The H. O. Canfield Co., Bridgeport, Conn., and will be in charge of sales of this company and its subsidiaries: Virginia Rubber Corp., Clifton Forge, Va., and Wabash Rubber & Plastics Corp., Seymour, Ind. He is a former vice president and manager of general sales of The Ohio Rubber Co.

Karl N. Carter

Edwin A. Norris

H. M. Johnson, Jr.

William C. Loughley

William C. Loughley has been advanced to vice president—manufacturing—of Swan Rubber Co, Bucyrus, O., and in this new position, created as a result of an expansion program, will act as general manager over manufacturing facilities of all Swan plants. Mr. Loughley started with the concern 26 years ago as head of the automotive brake lining department and later became head of the small tire division.

James M. Church, professor of chemical engineering, Columbia University, New York, N. Y., has been elected a director of Riverside Plastics Corp. Professor Church has been a technical consultant to several chemical and plastics companies in the New York metropolitan area and had been in the employ of Monsanto Chemical Co. and I. E. du Pont de Nemours & Co., Inc. He is an outstanding authority in the fields of organic chemical processing and plastics.

Myles N. Murray has joined Parker Appliance Co., Cleveland, O., as product specialist with its rubber products division.

H. M. Johnson, Jr., has been appointed product manager, rubber, of the Silicones Division, Union Carbide Corp., and **J. H. Lorenz** has been appointed assistant manager. Mr. Johnson will have his headquarters in New York, N. Y., and Mr. Lorenz, at the Division's plant and offices in Tonawanda, N. Y.

Howard S. Bergen, Jr., former sales specialist on plasticizers, and **August R. Hempel,** former technical sales specialist on resin materials, have been appointed sales managers of plasticizers and resin materials, respectively, for Monsanto Chemical Co.'s organic chemicals division, St. Louis, Mo. Bergen succeeds **Howard I. Armstrong,** who has been appointed district sales manager for the division at Chicago. Hempel takes over a vacancy created by the promotion of **H. James Lawler** to an assistant directorship of sales at St. Louis with overall responsibility for plasticizers, resin materials, and paper chemical sales.

Charles R. Dear has been appointed manager of marketing research for the textile division, United States Rubber Co., New York, N. Y. Mr. Dear, formerly a vice president of A. D. Juilliard Co., joined the rubber company's textile division a year ago and was acting manager of marketing research for the past six months.

Willard W. Ruppel has been appointed western regional manager for Great American Industries, Inc., 7 Front St., San Francisco, Calif. Some of the product line of Great American includes the open and closed cellular rubber products fabricated by the Rubatex Division, Bedford, Va.

Henry C. Steffen

Henry C. Steffen has joined Columbian Carbon International, Inc., as director of technical sales and service for the rubber industry and will have charge of such sales and service abroad on raw materials and equipment, including carbon blacks and other products of Columbian Carbon Co. After five years with Binney & Smith Co., Mr. Steffen transferred to Columbian in 1930 and has been active in research, development, and production.

J. H. Lorenz

Clyde A. Berger

Clyde A. Berger has been advanced to the pigment development managership at The New Jersey Zinc Co., New York, N. Y., and will, among other duties, direct the sales engineering staff in pigment sales service activities. Mr. Berger has spent more than two decades with the company, mostly in sales.

M. R. Buffington has resigned as vice president and technical director of Lea Fabrics, Inc. He expects to continue as a consulting rubber chemist, 56 Browning Rd., Short Hills, N. J.

William Rudko has joined Rubber & Asbestos Corp., Bloomfield, N. J., as plant manager in charge of production facilities. He was formerly plant manager at F. H. Maloney Co., Houston, Tex., and has been associated with the rubber industry for more than 17 years.

Frank X. Hines last month was appointed advertising manager of Lee Rubber & Tire Corp., Conshohocken, Pa. With the company six years, he served most recently as acting advertising manager.

A. B. McFadden has established his headquarters in Atlanta, Ga., and **C. H. Peterson**, in Detroit, Mich., as pigment sales representatives for The New Jersey Zinc Co., New York, N. Y.

George Bachtel, since 1951 associated with the industrial brake department of Goodyear Tire & Rubber Co.'s aviation products division, has been appointed to the newly created position of administrative assistant to E. M. Eickmann, general manager of the division.

Norman T. Shideler was elected president of Insul-Mastic, Inc., a newly acquired subsidiary producing for the Protective Coatings Division, Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. He will also act as technical adviser and have direct responsibility for all coatings research and development. **Arthur E. Gray** succeeds Mr. Shideler as the division's general manager, where he will be responsible for management of the division which will now market the gilsonite-asphalt mastics in addition to the division's tar-base coatings. He was formerly sales manager of the division.

Edward Wolf has been named manager, and **William F. Burdick** appointed to the staff of the special products department of The Goodyear Tire & Rubber Co.'s aviation products division, Akron, O. As successor to **C. J. Ford**, resigned, Wolf is responsible for the sale of Terra-Tires, Rolli-Tankers, Airmat, Electro-Thermal De-icing and other special products produced by the division. Burdick joined aviation products as a special products sales representative after 15 years of field sales work.

Timothy Y. Hewlett, Jr., has been elected secretary and treasurer of Landers Corp., Toledo, O. **Earle A. Wentworth** has been chosen assistant treasurer. Mr. Hewlett will continue as general purchasing agent of the firm.

Joseph W. Gallagher has been appointed manager of marketing of the special products division, Lord Mfg. Co., Erie, Pa. He will be responsible for all sales and marketing activities of the division, which is currently marketing uncured rubber-to-metal and rubber-to-textile adhesives under the trade name Chemlok.

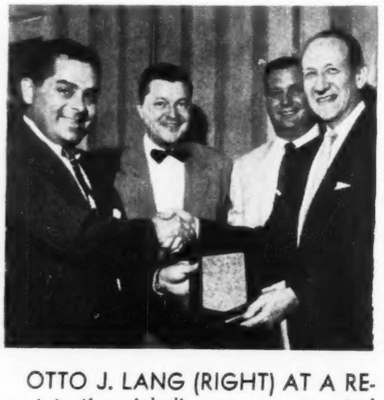
Ralph R. Calaceto has been appointed manager and sales engineer of the Process Equipment Division, Automotive Rubber Co., Inc., Detroit, Mich. His sales duties will be in connection with the development of equipment and processes for waste and recovery systems in the chemical and allied industries.

Howard R. Wilson has been appointed senior chemical engineer for process design with The General Tire & Rubber Co., Akron, O. Dr. Wilson, formerly with H. K. Ferguson Co., as staff engineer, has a long history of achievement in the chemical engineering field which began with E. I. du Pont de Nemours Co., Inc., in 1936.

Dwight A. Bessmer

Dwight A. Bessmer has been named executive vice president of The Timken Roller Bearing Co., Canton, O. His new position will include general administrative duties for all plants and offices of the company. He has been with Timken since 1933; in 1942 he was made director of purchases, in 1950 assistant to the president, and in 1953 he was elected a vice president.

Kenneth C. Towe, since January, 1952, president of American Cyanamid Co., New York, N. Y., has been elected to the newly created post of chairman of the board of directors; and **Wilbur G. Malcolm**, formerly vice president for marketing, has been elected president and chief executive officer of the company. In addition, **Kenneth H. Klipstein**, vice president, was elected a director.



OTTO J. LANG (RIGHT) AT A RECENT testimonial dinner was presented a plaque by Connecticut Rubber Group Chairman Harry Gordon (far left) for outstanding service in the organization of the Group's educational course last year. Onlookers are James R. Boyle, master of ceremonies and chairman of testimonial; and George B. Jerolman, who presented a portable radio to Lang.

A. H. Ingley, vice president-manufacturing for the past nine years and a director of the Diamond Alkali Co., Cleveland, O., since April, has been advanced to senior vice president, a newly created position. **James A. Hughes**, treasurer of the company since mid-1955, is now vice president-administration, also a new post in the Diamond organization. **Donald S. Carmichael**, secretary for ten years, has assumed also the additional post of general counsel. **R. H. Armor**, assistant treasurer since 1953, succeeds Hughes as treasurer.

James H. Phillips has been appointed manager of sales and production coordination for the textile division, United States Rubber Co., New York, N. Y. He joined the rubber company in 1950 and became a marketing and economic analyst at its New York headquarters in 1955.

Philadelphia Outing

(Continued from page 856)

and a putting contest. A cheese table was set up in the afternoon, and a gala dinner was served at 7:30 p.m. After dinner, prizes were awarded to the winners of the various events, and door prizes were given all present.

R. A. Garrett, Armstrong Cork Co., was the outing chairman. The members of his committee were: T. W. Elkin, R. T. Vanderbilt Co., Inc.; A. L. Shaw, B. F. Goodrich Co.; and V. H. Perrine, Thiokol Chemical Corp.

T. N. Loser, Wyrough & Loser, directed the golf tournament. Among the prize winning members were: low gross, first, J. W. Baymiller, Armstrong Cork Co., (he also won the Julius Muehlstein trophy, which was presented by Sid Freedman, of Muehlstein); second, J. W. Powless, Carlisle Tire & Rubber Co., and third, Henry Pryor, R. E. Carroll, Inc.; low gross, guests, A. R. Loosli, American Cyanamid Co. Hole-in-one winners were: members, John Baymiller; E. F. Webster, General Magnesite & Magnesia Co., and O. B. Samler, Vanderbilt; guest, Eric T. Burgess, Firestone Tire & Rubber Co.

There was a three-way tie for the first prize under the Calloway system, involving Art Partrick, Dewey & Almy Co., Bud Behney, Harwick Standard Chemical Co., and M. W. McMicken, Armstrong Cork. Prize winners for guests under the Calloway system were Jim Gkonos, E. I. du Pont de Nemours & Co., Inc., J. F. Wernersbach, Enjay Labs, and E. Osborne, B. F. Goodrich Chemical Co.

High gross winner was Ray Evans, John Roebling's Sons Corp. For his efforts he received a new "trophy" awarded by the retiring director for the Group, George Wyrough, Wyrough & Loser.

Prize winners of the putting contest, under the direction of R. B. Carroll, R. E. Carroll, Inc., were: Kinsey Weimer, Carlisle Tire; J. Geris, Bonafide Plastics; and Dick Hendricksen, Phillips Chemical Co.; and guest, Jim Trexel, Du Pont.

The next meeting of the Group will be held on October 25 at the Poor Richard Club, Philadelphia, Pa.

Obituaries

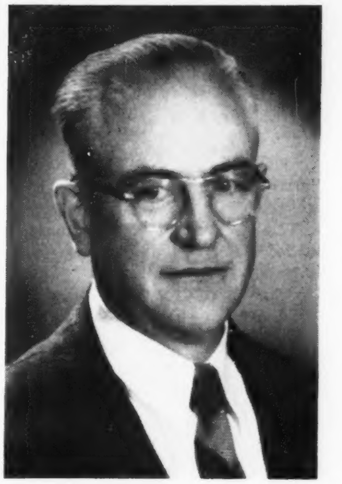
Walter R. Anyan

Walter R. Anyan, 60, secretary of The New Jersey Zinc Co., New York, N. Y., died July 25 at a Greenwich, Conn., hospital. He had joined the company in 1915 and advanced through the organization to become secretary in 1948.

The deceased was a graduate of Polytechnic Institute of Brooklyn, a member of the board of the First Congregational Church of Old Greenwich, a 32nd degree Mason and a Shriner and was also active in the YMCA.

Surviving are the widow and a son.

Carroll Campbell Davis



Carroll Campbell Davis

Carroll Campbell Davis, retired chief chemist of the Boston Woven Hose & Rubber Co., division of American Biltrite Rubber Co., editor, *Rubber Chemistry and Technology*, and Goodyear Medalist (1950) of the Division of Rubber Chemistry, American Chemical Society, died suddenly on August 10 of a cerebral hemorrhage in Worcester, Mass.

Known as "C. C." in rubber industry circles, Mr. Davis was one of the best known and respected men in this country and abroad because of his many years as editor of the Division's publication and was perhaps the person most responsible for the present widespread availability of technical information on rubber throughout the world.

Mr. Davis was graduated from Dartmouth College in 1911 with a B.S. in chemistry and then studied engineering at Massachusetts Institute of Technology, from which he received a B.S. in chemical engineering in 1914. His entire industrial career was with Boston Woven Hose. In collaboration with John M. Bierer, now company president, he established a worldwide reputation in 1924 and 1925 with the first practical oxygen aging test in the industry and the use of antioxidants in rubber. Further papers on reclaimed rubber and specifications, again with Mr. Bierer, followed in 1926 and 1927.

Mr. Davis has been an abstractor for *Chemical Abstracts* since 1919, and he became the editor of *Rubber Chemistry and Technology* in 1925, in which latter position he was aided by Mrs. Davis until his death. He was the editor and John T. Blake, Simplex Wire & Cable Co., associate editor, of the ACS monograph, "The Chemistry and Technology of Rubber," published in 1937; and in 1954, with R. F. Dunbrook, Firestone Tire & Rubber Co., the deceased assisted G. S. Whitby, University of Akron, in editing another Rubber Division, ACS, monograph, "Synthetic Rubber." Davis was also a section editor of the Division's publication, "Rubber Bibliography" and had been a member of the editorial advisory board of RUBBER WORLD for more than ten years.

He was born in West Roxbury, Mass., on September 4, 1888.

Memorial services were held at the Arlington Street Church Chapel in Boston on August 20.

Mr. Davis is survived by his wife and two sons.

Financial

American Brake Shoe Co., Detroit, Mich. January 1-June 30, 1957: net profit, $5,426,912, equal to $3.64 a share, against $4,825,770, or $3.09 a share, in the 1956 months.

American Zinc, Lead & Smelting Co., Columbus, O. First half, 1957: net income, $900,043, equal to 76¢ a share, contrasted with $1,534,231, or $1.30 a share, a year earlier.

Anaconda Wire & Cable Co., New York, N. Y. Six months to June 30, 1957: net earnings, $3,359,208, equal to $3.98 a share, compared with $5,133,607, or $6.08 a share, in the 1956 period.

Belden Mfg. Co., Chicago, Ill. First six months, 1957: net profit, $693,068, equal to $1.78 a share, against $861,035, or $2.22 a share, in the same months last year.

Sidney Blumenthal & Co., Inc., New York, N. Y. Six months ended June 30, 1957: net loss, $203,967, contrasted with net earnings of $85,088, equal to 24¢ a capital share, in the 1956 half; net sales, $8,120,563, against $9,848,389.

Armstrong Cork Co., Lancaster, Pa., and domestic subsidiaries. Initial half, 1957: net profit, $6,152,000, equal to $1.17 a common share, against $6,847,783, or $1.32 a share, in the corresponding months last year; net sales, $124,391,488, against $123,289,041.

Borden Co., New York, N. Y. January 1-June 30, 1957: net income, $11,402,120, equal to $2.42 a capital share, against $10,710,000, or $2.27 a share, in the like period last year; sales, $454,052,226, against $423,380,193.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. Six months to June 30, 1957: net profit, $16,974,939, equal to $1.90 a common share, against $17,239,136, or $1.92 a share, a year earlier; net sales, $321,624,442, against $309,741,181.

Brown Rubber Co., Inc., Lafayette, Ind. June half, 1957: net loss $116,375, contrasted with net income of $132,672, equal to 35¢ a capital share, in the 1956 period.

Brunswick-Balke-Collender Co., Chicago, Ill. Initial half, 1957: net profit, $1,262,800, equal to $2.27 a share, contrasted with $391,110, or 67¢ a share, in the 1956 half.

Carborundum Co., Niagara Falls, N. Y. First half, 1957: net earnings, $3,057,866, equal to $1.78 a share, compared with $3,537,758, or $2.06 a share, in the 1956 half.

Celanese Corp. of America, New York, N. Y., and domestic subsidiaries. Six months to June 30, 1957: net income, $5,613,890, equal to 56¢ a common share, compared with $6,185,602, or 65¢ a share, in the like months last year; net sales, $95,304,991, against $94,421,267.

Columbian Carbon Co., New York, N. Y., and subsidiaries. Six months ended June 30, 1957: net profit, $2,672,759, equal to $1.66 a capital share, compared with $3,237,247, or $2.01 a share, in the 1956 months; net sales, $36,193,304, against $32,532,594.

Cooper Tire & Rubber Co., Findlay, O. Initial half, 1957: net earnings, $155,351, equal to 60¢ a share, contrasted with $301,288, or $1.17 a share, in the first half of 1956.

Crown Cork International Corp., Baltimore, Md. Six months ended June 30, 1957: net profit, $772,016, equal to $1.99 a share, compared with $596,489, or $1.54 a share, in the 1956 months.

Dow Chemical Co., Midland, Mich. Year ended May 31, 1957: net income, $53,100,000, equal to $2.15 each on 24,772,235 common shares, compared with $59,700,000, or $2.52 each on 23,663,674 shares, in the preceding fiscal year; net sales, $627,819,059, against $565,260,085.

Crown Cork & Seal Co., Inc., Baltimore, Md. June half, 1957: net loss, $29,000, contrasted with net income of $891,000, equal to 51¢ a common share, in the first half last year; net sales, $60,776,000, against $59,750,000.

DeVilbiss Co., Toledo, O. Six months ended June 30, 1957: net earnings, $802,-452, equal to $2.23 a share, against $773,-848, or $2.15 a share, in the 1956 period.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. First half, 1957: net earnings, $201,243,967, equal to $4.30 a share, against $187,824,657, or $4.01 a share, in the 1956 half.

Du Pont Co. of Canada (1956), Ltd., Montreal, P.Q. Six months to June 30, 1957: net income, $2,639,000, equal to 35¢ a share, against $2,453,000, or 33¢ a share, in the like period of 1956.

Endicott Johnson Corp., Endicott, N. Y. Six months ended May 31, 1957: net earnings, $1,694,723, equal to $1.91 a share, against $1,497,003, or $1.67 a share, in the same months last year; sales, $70,226,849, against $73,557,466.

Farrel-Birmingham Co., Inc., Ansonia, Conn. Six months to June 30, 1957: net profit, $1,526,284, equal to $4.77 a share, contrasted with $528,680, or $1.65 a share, in the 1956 period.

Flintkote Co., New York, N. Y. January 1-June 30, 1957: net earnings, $2,528,059, equal to $1.61 a share, against $2,155,610, or $1.47 a share, in the similar period last year; sales, $53,830,403, against $50,372,692.

General Cable Corp., New York, N. Y. First half, 1957: net earnings, $6,521,270, equal to $2.25 a share, against $5,491,047, or $1.93 a share, in last year's months.

General Electric Co., Schenectady, N. Y. First six months, 1957: net earnings, $127,-823,000, equal to $1.47 a common share, compared with $112,864,000, or $1.30 a share, in the same months a year ago; sales, $2,121,310,000, against $1,958,974,-000.

General Motors Corp., Detroit, Mich. First six months, 1957: net profit, $481,-236,708, equal to $1.71 a share, compared with $503,471,823, or $1.80 a share, in the 1956 period.

Hercules Powder Co., Wilmington, Del. Initial half, 1957: net income, equal to $1.03 a share, against $1.18 a share in the same period last year; sales, $124,752,266, against $120,433,778.

Johnson & Johnson, Inc., New Brunswick, N. J. First half, 1957: net profit, $6,511,000, equal to $3.08 a share, against $6,526,000, or $3.10 a share, in last year's half.

The B. F. Goodrich Co., Akron, O., and subsidiaries. First six months, 1957: net profit, $19,728,926, equal to $2.21 a common share, compared with $21,507,-367, or $2.41 a share, in the 1956 months; net sales, $366,008,979, against $364,-374,921.

Goodyear Tire & Rubber Co., Akron, O. First six months, 1957: net income, $53,943,585, equal to $3.47 a share, compared with $30,655,683, or $2.96 a share, in the first six months of 1956; sales, $721,035,882, against $683,066,058.

Hewitt-Robins, Inc., Stamford, Conn. First half, 1957: net earnings, $590,220, equal to $1.44 a common share, compared with $513,313, or $1.23 a share, a year earlier; net sales, $28,885,320, against $25,616,250.

Johns-Manville Corp., New York, N. Y. Six months to June 30, 1957: net income, $8,614,000, equal to $1.20 a share, contrasted with $12,004,685, or $1.87 a share, in the first half of 1956; sales, $148,072,-000, against $147,359,000.

Kendall Co., Walpole, Mass. Twenty-four weeks to June 15, 1957: net income, $1,665,000, equal to $1.57 a share, contrasted with $2,281,000, or $2.17 a share, a year earlier.

Liquid Carbonic Corp., Chicago, Ill. Nine months ended June 30, 1957: net profit, $2,617,732, equal to $2.25 a share, compared with $1,939,308, or $1.71 a share in the 1956 months; sales, $25,888,-451, against $24,496,287.

Mansfield Tire & Rubber Co., Mansfield, O. June half, 1957: net earnings, $624,252, equal to $1.00 a common share, compared with $701,450, or $1.14 a share, in the 1956 period; net sales, $30,105,542, against $31,593,710.

McNeil Machine & Engineering Co., Akron, O. Initial half, 1957: net income, $1,804,239, equal to $3.00 a share, compared with $1,362,273, or $2.32 a share, in the 1956 half.

Monsanto Chemical Co., St. Louis, Mo., and domestic and Canadian subsidiaries. Initial half, 1957: net income, $22,164,000, equal to $1.03 a share, against $21,975,-000, or $1.03 a share, a year earlier; sales, $297,146,000, against $280,257,000.

Mt. Vernon Mills, Inc., New York, N. Y. Six months ended June 30, 1957: net profit, $441,000, equal to 58¢ a share, contrasted with $757,000, or $1.00 a share, a year earlier; sales, $22,487,000, against $21,421,000.

National Lead Co., New York, N. Y. January 1-June 30, 1957: net income, $30,115,564, equal to $2.49 a common share, against $28,998,985, or $2.40 a share, in the like period last year; sales, $281,790,127, against $289,234,320.

Midwest Abrasive Co., Owosso, Mich. Six months ended June 30, 1957: net earnings, $254,856, equal to 69¢ a share, against $188,807, or 62¢ a share, in the corresponding months a year ago

Minnesota Mining & Mfg. Co., St. Paul, Minn., and domestic and Canadian subsidiaries. Six months to June 30, 1957: net earnings, $19,692,980, equal to $1.17 a common share, compared with $17,670,-767, or $1.06 a share, in last year's months; net sales, $181,578,367, against $154,495,586.

National Rubber Machinery Co., Akron, O. First six months, 1957: net earnings, $215,950, equal to $1.05 a capital share, compared with $289,728, or $1.48 a share, in the 1956 months; sales, $7,696-774, against $6,100,046.

The New Jersey Zinc Co., New York, N. Y., and subsidiaries. June half, 1957: net profit, $1,704,219, equal to 87¢ a share, compared with $1,018,403, or 52¢ a share, in the preceding year's half; net sales, $10,161,017, against $9,320,739.

Nopco Chemical Co., Harrison, N. J., and subsidiaries. Six months ended June 30, 1957: net earnings, $781,450, equal to $1.55 a common share, compared with $804,550, or $1.60 a share, in the same half last year; sales, $14,345,732, against $13,378,798.

Okonite Co., Passaic, N. J. January 1-June 30, 1957: net income, $16,140, equal to 8¢ a capital share, contrasted with $982,747, or $5.09 a share, a year earlier.

O'Sullivan Rubber Corp., Winchester, Va. First six months, 1957: net profit, $61,949, contrasted with net loss of $46,414 a year earlier.

Parke, Davis & Co., Detroit, Mich. First half, 1957: net income, $11,096,496, equal to $2.26 a common share, compared with $8,633,950, or $1.76 a share, in the corresponding months last year; net sales, $75,-886,342, against $66,582,158.

Pennsalt Chemicals Corp., Philadelphia, Pa. First half, 1957: consolidated net income, $1,955,749, equal to $1.53 a capital share, compared with $2,147,972, or $1.73 a share, in last year's half; sales, $40,798,282, against $37,118,293.

Phelps Dodge Corp., New York, N. Y. First half, 1957: net earnings, $27,562,665, equal to $2.72 a share, contrasted with $51,124,617, or $5.04 a share, in the 1956 half.

Plymouth Rubber Co., Inc., Canton, Mass. Twenty-six weeks ended June 2, 1957: net profit, $505,479, equal to 58¢ a share, compared with $471,515, or 53¢ a share, in the corresponding weeks of 1956; sales, $10,221,321, against $9,429,-467.

(Continued on page 900)

News from Abroad

Great Britain

RGA Optimistic About Future of NR

The Rubber Growers' Association held its annual general meeting in London, May 24. In the course of his talk, the retiring chairman, T. H. Karsten, expressed himself as very hopeful about the future of natural rubber; at the proper price, he said, there would always be a market for the product, and he believed that natural rubber could beat synthetic in price. Actually, synthetic would stabilize the price of natural rubber, and there was in fact no longer any need of considering artificial measures for stabilizing natural rubber prices. Convinced as he was of the good prospects of natural rubber, he could not understand the apprehension of some shareholders, leading to liquidation and fragmentation of estates, in which he saw a threat.

The chairman for the ensuing year is E. D. Shearn, a lawyer who has had Malayan experience in his profession as well as in the rubber industry, as owner and director of estates. He retired to London in 1951 and is a director of rubber companies.

The new vice chairman, A. W. Wallich, was born in Malaya and during 1947-49 was a member of the legislative and executive councils, Federation of Malaya. He joined the board of Boustead & Co., Ltd., London, in 1950 and is a director of rubber companies.

Twelfth Foundation Lecture Given by J. M. Buist

The twelfth Foundation Lecture of the Institution of the Rubber Industry, on "Polymer Testing and Its Contribution to Developments in Industry," was given in Manchester, May 24, by J. M. Buist. A summary is presented below.

Much of the day-to-day business of the rubber and plastics industries is firmly based on testing materials, Mr. Buist said; in the last seven years between 500-600 new materials have been developed for the rubber industry, and the rate at which new products are being developed appears to be increasing. The correct methods of test must be chosen to describe the properties of new materials, and the results must be expressed in terms readily understood by all sections of the industry.

He then discussed five testing subjects. With regard to the first of these, flex cracking, he pointed out that the variability of the De Mattia test has been reduced appreciably, but that still better reproducibility is required, and equally important correlation studies between the De Mattia test and many service applications are urgently required before any further major advance can be made.

The ASTM[1] ozone exposure apparatus (ASTM D 1149-51 T) has a number of deficiencies, he went on. The ICI[2] ozone exposure apparatus is believed to be free of these deficiencies and is used to provide results of static exposure to ozone. A new dynamic test, based on the De Mattia test, but employing a modified test piece was then described. Good correlation is obtained between outdoor De Mattia tests and a De Mattia machine enclosed in ozonized air in the laboratory. These tests provide industry with simple means of assessing static ozone cracking and dynamic and atmospheric cracking.

As to wear testing, the general dissatisfaction with laboratory and service tests is due to too much being expected of the laboratory test. He suggested the employment of a technique whereby an integrated view of wear obtained from sets of isolated conditions could be built up into a continuous wear curve covering a wide range of conditions. By the use of the power law relationship: $y=ax^n$, accurate predictions of service wear of many types of rubber articles can be made, and results between different laboratory machines correlated.

Color testing and light aging, and testing of cellular products were also dealt with, and several improvements suggested.

Finally the speaker discussed the role of testing in development work. Buist stressed the importance of analyzing the position at each stage between initiating the research and starting production, to permit proper evaluation of tests and testing techniques, and the need constantly to improve test methods in order to insure continued progress in development work.

[1]American Society for Testing Materials, Philadelphia, Pa., U.S.A.
[2]Imperial Chemical Industries, Ltd., London, England.

Brandon Retires As RJ Editor

Effective August, 1957, Frederick T. Brandon retired from the editorship of the *Rubber Journal*, London. His successor is J. D. Copeman, who is to be assisted by R. J. Rowland. Mr. Brandon joined the editorial staff of Maclaren & Sons, Ltd., in 1919 and has been editor of the *Rubber Journal* since 1942, when it was still known by its earlier name of *India Rubber Journal.*

France

Reclaiming Silicone Rubber Scrap

A reversion process for regenerating silicone rubber scrap, which makes it possible to obtain homogeneous, smooth sheets from the reclaim in a matter of minutes, has been described by R. Riolfo.[1] This process consists in rendering the material plastic by heat-treating the scrap in a tightly closed container in the presence of a small amount of air which remains unchanged. Reversion time depends on heating temperature and the type of material; a higher temperature reduces reversion time so that the same result is obtained by heating a given material for 16 hours at 200° C. as when heating it for 1½ hours at 250° C. At 300° C., reversion would be still more rapid, but might not be uniform throughout; hence 250° C. is the preferred temperature.

As to the type of material, the greater the amount of volatile substances that it can liberate during the heating process, the shorter the reversion time. This, we note, is the reason why vulcanized silicone rubber scrap that has already been reheated requires a longer time for reversion than that which has simply been vulcanized, and if the material is of the type that has been specially treated to retain its elasticity under prolonged heating in a confined atmosphere, it is "anti-reversion," and no reversion takes place.

Smooth, uniform sheet is easily made from the reclaim on a roll mixer, but it is very tacky and can be used only after the addition of new silicone rubber of the same original type; the new material is brought to the same degree of plasticity as the reclaim before blending, which must be done very thoroughly. The most satisfactory results are obtained when the proportion of reclaim to new material is 1:3 (or less), when mechanical properties are very similar to those of all-new material. Proportions of reclaim may be higher (up to 1:1), and such compounds, although tacky and less "nervy" than new silicone rubber, are found suitable for various purposes.

The reversion method is simple, requiring only an oven that can be heated to 250° C. and a roll mixer; however, materials must be sorted according to type, and "anti-reversion" silicone rubber that has been reheated as well as vulcanized must be excluded.

Le Bras Decorated For Rubber Services

Jean Le Bras, scientific inspector general of the Institut Français du Caoutchouc Paris, France, and of the Rubber Research Institute of Indo-China, was recently again distinguished for his services to the rubber industry. At a ceremony held in Paris in March, 1957, he was among those promoted to the grade of Commander of the Order of Merit for Research and Invention.

[1] *Rev. gén. caoutchouc*, Apr., 1957, p. 352.

Malaya

Competition from Synthetic, Estate Fragmentation Views

The chances of natural rubber in the competition with synthetic rubber and the possible spread of fragmentation of European estates continue to be the main topics of discussion in Malaya as it became an independent nation on August 21. Concentrating chiefly on the first problem, Sir Eric Macfadyen, speaking at a meeting of the New Crocodile (Selangor) Rubber Co., said that since passing into private hands, the American synthetic rubber industry has become increasingly efficient, and more versatile synthetics are now available, so that the field of use in which natural rubber commands a strong preference is likely to contract. To offset this condition, he declared, more new capital should be introduced for expanding rubber growing; a certain amount of new planting is taking place, but the European investor does not seem interested for the time being, particularly in the case of Malaya, where the investor is dubious about the consequences of self-government.

Opinion on fragmentation of large rubber estates seems to depend largely on what aspect of the question the speaker wants to consider. Those who claim to have confidence in a self-governing Malaya —and these seem to be in the majority —naturally see no need of selling out and hence are also inclined to minimize the chances of a dangerous spread of fragmentation. Others, concentrating primarily on the possible effects of the practice if it does grow, are less optimistic and warn of resulting unemployment and loss of revenue to the government.

H. K. Dimoline, secretary of the United Planters' Association of Malaya for the past nine years, is among those who feel uneasy about fragmentation. He is leaving Malaya for good after 12 years in the rubber planting industry. Recently, in discussing the rubber situation, he warned that plantation owners must have the latest "know-how" to produce rubber of highest quality, and breaking up of modern estates into "penny packets" must reduce efficiency. A spread of the splitting up of estates would disturb labor; furthermore Malaya would suffer the loss of experienced planters, the backbone of the rubber industry.

Mr. Dimoline also touched on the difficulty estates have in obtaining new land, a situation that might turn many a prospective investor to undertake new planting in other countries. West Africa, for instance. As to synthetic rubber competition, he thought this need not be feared by estates 100% replanted with high-yielding material: they could compete with synthetic rubber at present prices, and he had a feeling, he added, of the possibility that synthetic rubber prices are more likely to rise than fall in the future.

A non-European view of the matter, that has the added interest of representing labor, is that expressed by the general secretary of the National Union of Plantation Workers, P. P. Narayan, on his return recently from a two months' tour of the United States.

"A complete reassessment of the situation and in certain cases reorganization of the rubber industry, especially in the matter of administrative and production costs, is required," he warned.

The employment of local staff, internal reorganization and centralization of factories, incentive schemes, and the introduction of a new category of workers, latex collectors, in addition to tappers, would have to be considered if the cost of natural rubber is to be reduced to make it competitive with synthetic rubber, he explained.

The Senior Assistant Minister for Commerce and Industry, Inche Mohammed Khir, reportedly supports these views.

Estates Replanting Grants

A total of \$152,977,950 (Straits currency) will be paid by the Federation Government to meet claims for grants under the replanting scheme for estates. Of this amount, \$136,347,200 will cover grants at \$400 per acre for 340,868 acres registered under the scheme. The balance will go to pay grants for approved replanting and new planting that took place during 1953, at \$150 per acre, and in 1954, at \$250 per acre. The total area replanted in 1953 came to 36,540 acres, and in 1954 to 44,181 acres. If the full aim of the scheme is to be achieved, estates will have to replant or new plant 360,346 acres during 1956-1961. During the period 1948-1955, inclusive, estates replanted 397,000 acres.

Schemes for Malays

Land development and rural welfare for Malays have been the chief objectives of government schemes in progress or to be started in the vast Temerloh district of the Pahang, the least developed state in Malaya. The scheme includes: opening up 15,000 acres of jungle land for rubber planting, with processing and exporting of first-grade rubber by Malay smallholders the eventual goal; teaching blind Malays how to earn a living by tapping rubber or planting padi; planning the first trade school for rural Malays.

Non-Malays are being attracted by the potentialities of unreserved land and industrial development in the district. Chinese have already applied to convert 25,000 acres in one section into rubber plantings, half of the area to be divided into estates of 500 to 1,000 acres, and the other half to be split into smallholdings of nine acres each.

Industry Notes

Production of rubber during June, 1957, the highest since January, brought total output for the first half of 1957 to 305,-493 tons, against 305,876 tons in the 1956 period. Rubber exports for the first six months of 1957 were 469,281 tons, compared with 472,063 tons in the corresponding half of last year.

The Federation exported nearly 13,000,-000 rubber seeds in 1956, with Siam, the biggest importer, taking 4,865,100 seeds; 3,527,800 went to North Borneo; 2,229,-680 to Sarawak, and 1,031,000 to Nigeria.

Shum Yip Leong Rubber Works, Ltd., has been making rubber tiles in its factory in Klang for the past two years. The first rubber tiles to be produced locally, they are claimed to compare favorably with the imported products and are cheaper. They come in 13 colors and two patterns and can be used on wood as well as cement floors with the aid of a special adhesive, also manufactured by the company.

New Guinea

Australia's NR Supply?

Papua and New Guinea supply only about 7% of Australia's requirements of natural rubber; most of the balance comes from Malaya. It is hoped, however, that eventually all Australian rubber needs will be covered by rubber from this territory.

A recent review of the National Bank of Australasia, Ltd., reveals that at present the total area under rubber in New Guinea and Papua is only about 28,000 acres, and much of it is low-yielding. But efforts are being made to boost production; the best planting material is being imported from Malaya, and Malayan experience and advice form the basis of experiments and expanding research in New Guinea. Already high-yielding material is being used for new planting and for replanting old areas.

Rubber exports from Papua increased from 1,198 tons in 1948-49 to 3,789 tons in 1955-56, and production is expected to reach 4,000 tons in 1957-58.

Bulgaria

Determining Free Sulfur

A new method of determining free sulfur, referred to as the "Sulfide Method," has been reported on[1] by P. D. Nikolinski and Sw. N. Slawow, of the Chemical-Technological Institute of Sofia. Samples of ground rubber compounds are boiled with an aqueous sodium sulfide solution, and the polysulfide formed is oxidized to sodium sulfate and sulfuric acid by means of hydrogen peroxide. The resulting sulfuric acid neutralizes an equivalent amount of NaOH initially added in excess to the sulfide solution. Determination then takes place by titration with 0.1 N sulfuric acid and methyl orange as indicator.

If mixes contain water-soluble ingredients (calcium or magnesium oxide, sodium carbonate, etc), the sample is first neutralized by boiling in dilute hydrochloric acid before the above treatment.

The method, which requires only cheap reactants and takes but little time, is said to give very useful results, comparable to those obtained by other procedures; it is specially recommended for rapid determinations of free sulfur in process control.

[1] *Kautschuk u. Gummi*, June, 1957, 146 WT.

Indo-China

Cexo Coagulation Process

The Cexo process[1] for coagulating plantation rubber latex was developed by Société des Caoutchoucs d'Extreme-Orient (C.E.X.O.) to combat the high costs of rehabilitating and operating its plantation factories after the war. The company owns seven estates within a radius of 50 kilometers of the main plantation at Loc-Ninh. During the war the factories were largely destroyed, and it was the high cost of equipment needed for the customary method of preparing plantation rubber, combined with the high cost of labor involved, that induced the company to try new ways that would be rapid, more economical than the old processes, and yield a good quality of uniform rubber, complying with RMA standards.

In working out a new technique, C.E.X.O. technologists took the following factors into consideration:

Homogenization of fresh latex in quantities up to 25,000 liters naturally results in uniform coagulation throughout.

The high proportion of ammonia required by the company's method of latex collection and transportation accelerates gelling; hydrolysis and the formation of soaps take place, and the soaps are known to accelerate coalescence; a minute quantity will modify the external protein layer of the rubber globules, facilitating their agglomeration.

Coagulation is facilitated when the temperature is somewhat higher, between 28 and 35° C.

Vigorous agitation of the latex after acidification greatly reduces the preflocculation period; the time varies from latex to latex.

Variations in coagulation pH are important as a factor in the variability of rubber.

The Cexo process was developed, and since early 1954 two experimental installations have been operating, each producing three tons daily. Reception, filtration, and bulking of the latex take place as usual, but from then on the procedure follows entirely new lines. The new equipment consists of a long, double-jacketed aluminum tank that acts both as agitator and heater, and is tiltable; then there is a special acid tank as long as the first tank, and also tiltable; and coagulating "chutes."

The undiluted latex goes into the first tank, where it is mixed with the necessary amount of water to bring it to the proper concentration. Hot water, circulating between the double walls of the tank, heat the latex. When the tank is full, and the latex has reached the right temperature, 5% formic acid solution is quickly tipped into the latex from the acid tank. Then the latex is vigorously stirrred by agitators until flocculation starts; next the latex is tipped into the coagulating chutes (pans, 18 meters long and 35 centimeters wide—about 20 feet by 14 inches) to a depth of 10 to 12 inches. Complete gelling takes 10 minutes; then the coagulum is floated into the washing troughs, after which it is immediately rolled out. Incidentally, the gelling period after flocculation is substantially constant.

By this method, it is said, 98% of the rubber produced is first-quality RMA. It is further noted that the process makes it easy to modify rubbers by the addition of chemicals since it facilitates dispersion and there is no risk of premature coagulation as with the usual methods of preparation.

[1] *Rev. gén. caoutchouc*, June, 1957, p. 583.

Ceylon

Estate Fragmentation and Nationalization Problems

Fragmentation of estates presents a problem also in Ceylon, and a Tea & Rubber Fragmentation Bill has been proposed to cover estates of more than 100 acres. Under this bill, fragmentation (except by inheritance) will be controlled by a statutory Board, and in those cases where it refuses permission to split up an estate, and substantial hardship is thereby caused proprietors, the State is to acquire the estate. Various objections have been made to the Bill, the strongest of which is that the State would be involved in the unnecessary expenditure of buying up bad estates.

Talk of nationalization of estates is still in the air, but the possible effects of such a measure are being more closely examined by government officials. The Minister of Posts, Broadcasting & Information, C. A. S. Marikkar, in a very frank speech acknowledged the value of the pioneer work of European planters and admitted that the loss of European planters, who are now leaving Ceylon, is a great blow to its economy. He considered nationalization of European-owned estates undemocratic and unwise, adding that nationalized estates would soon be turned into jungle from "sheer negligence."

Rubber Prices

Because of the downward trend of world prices for rubber, the prices the Rubber Commissioner pays for rubber for China have had to be reduced by ten cents a pound, effective June 18. This is the second time the official purchase price for rubber has had to be lowered since the beginning of the year. In March, the original price of 1.40 rupees was dropped to 1.25 rupees and this new cut brings it to 1.15 rupees per pound.

Incidentally, the Rubber Commissioner's Department is to be known in future as the Department of Commodity Purchase. Besides handling rubber for China under the rubber/rice pact, the Department controls all trade with China, both imports and exports.

China's Debt

A press report from Colombo, dated July 8, intimates that Ceylon, finally becoming impatient over China's failure to pay the 100,000,000 rupees owing Ceylon under the rubber/rice pact, has decided to sever trade relations unless a satisfactory settlement is reached. A five-man trade delegation, which left Ceylon for Peking on July 25, was to put settlement of the debt in the forefront of discussions and was to refuse further trade deals unless the debt was paid. The rubber/rice agreement is now nearing expiration.

Russia

Progress in Manufacturing

A description of some of the activities at the Yaroslavl Rubber Goods Plant in Russia, apparently taken from a Russian source, appears in the "Indian Rubber Bulletin" for May, 1957. This plant, in Yaroslavl, on the right bank of the River Volga, was started 25 years ago as a rubber and asbestos factory; it now includes several independent units, among them a tire and machinery plant, a cord factory, and asbestos and rubber goods plant. The rubber goods section, which formerly produced only heels and soles for footwear manufacturers, today turns out more than 1,000 different items for railroad transport, and for the automobile and tractor industries; the chief customer is the Gorky Automobile Works.

In the Summer of 1956 the company received an order to make rubber parts for automobiles for India, and the factory was for the first time faced with problems connected with the use of the articles under the tropical conditions of India. With guidance and advice from the Rubber Industry Research Institute, however, the various problems were solved.

To make rubber resistant to tropical conditions, we are told, 5% albichtol, a product of the distillation of shale resins, was added to the rubber. Albichtol is described as a clear, dark-yellow oil with such an unpleasant odor that workers had to wear gas masks when handling the material. Resistance to light and heat was increased by including 2% by weight on the rubber of a substance called neoson. For protection against the action of fungi in moist climate, tetramethyl thiuramdisulfide was incorporated in the mix, and as protection against white ants and other insects, pyrethrum and compounds of arsenic, mercury and fluorine were added; tetramethyl thiuramdisulfide also served to produce resistant, odorless goods. The finished articles were further protected by a special varnish coating.

At this factory too, polyisobutylene sheet is produced, for use chiefly to replace lead linings in apparatus in chemical plant.

Under the Sixth Five-Year Plan, the works expect to rebuild all the shops completely, without stopping operations for even an hour. Powerful new presses and other equipment and new conveyor lines are to be installed with the aim of cutting out all hand-operations and increasing labor productivity 40% by the end of 1960.

The factory has its own evening school for young workers, and 21 persons are studying at institutes and working at the factory at the same time. The plant employs special consultants for the workers who are studying in colleges and specialized secondary schools.

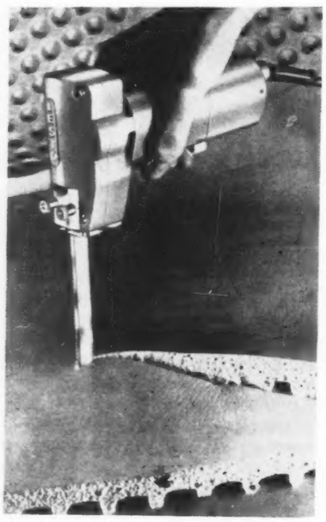
NEW EQUIPMENT

Hamilton's new drum handler

Hamilton Drum Handler

A new drum handler, designed to handle drums weighing up to 800 pounds, has been developed by Hamilton Equipment Co., Inc., Paterson, N. J. The new drum handler has several exclusive features. The unit, only six feet six inches in height, is a one-man controlled hydraulically operated lift which will elevate a drum 56 inches in its vertical position and to 63 inches for pouring. The drum is easily tilted and in the pouring position extends 10 inches over the lip of the tank.

Large wheels (sparkproof, if desired) make the unit easy to handle for pouring, stacking, tiering, truck loading and unloading, and for taking drums in and out of drum racks. Grab arms for carboys or fiber drums are available and readily interchangeable.

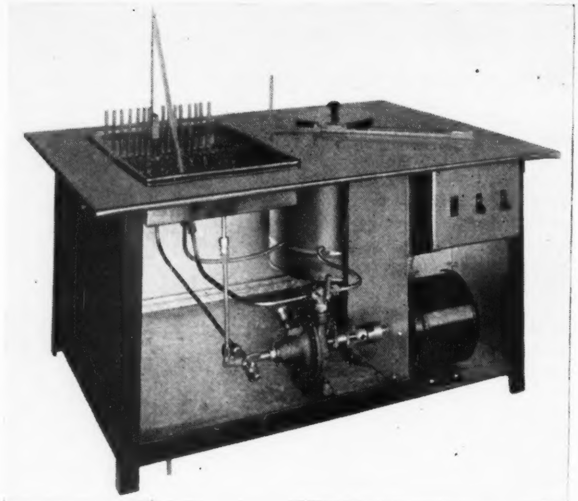


Lesto Foam Cutter

Lightweight Foam Rubber Cutter

A Swiss-made, lightweight, one-hand-operated cutter for rubber and plastic foam is being distributed in the United States by Victor J. Krieg, Inc., New York, N. Y. Called the electric foam rubber cutter Lesto GEQ2, its cutting is effected by two blades which reciprocate in opposite directions, driven by a powerful universal electric motor operating on both direct and alternating current. Blades are available for foam of 5¼-, 8-, and 11¾-inch thicknesses.

The cutter is manufactured by Scintilla, Ltd., Solothurn, Switzerland.



Scott T-50 State-of-Cure Tester equipped for temperature retraction test

Modified State-of-Cure Tester

Simple modifications enabling the Scott T-50 State-of-Cure Tester to make temperature retraction and brittleness tests now are available from Scott Testers, Inc., Providence, R. I. Originally designed to determine the state of cure of elastomeric compounds at temperatures ranging from —50 to +30° C., according to ASTM D599-55, the testers are easily fitted with the new adaptations.

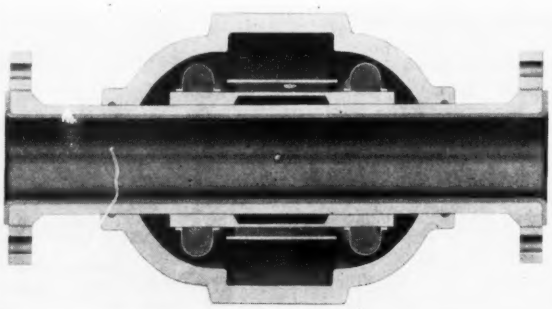
Provision for the temperature retraction test at —70° C., (ASTM D 1329-54T) requires that the original holders be lifted from the pan and replaced with others having appropriate graduations; while the substitution of a deeper bath pan enables the device to make brittleness tests at the required temperatures (ASTM D746-55T). Either or both of the modifications can be obtained with new units, and can be supplied for use in existing installations.

Foxboro Magnetic Flow Meter

A new-type flow meter for latex solutions, operating on Faraday's principle of electromagnetic induction, has been developed by Foxboro Co., Foxboro, Mass. Called the Magnetic Flow Meter, the new instrument is easier to maintain than the customary venturi meter and will tolerate a build-up of latex in the metering tube with no effect on accuracy.

A sraight-through section of flanged pipe, having the same diameter as the flow line, serves as a metering tube. Its interior is insulated with a coating of Teflon, Kel-F, or glass, and two electrodes, diametrically opposed, are mounted flush with the inside surface. Coils, saddling the tube, produce a magnetic

(*Continued on page 884*)



Sectional view of Magnetic Flow Meter transmitter showing details of lining, electrodes, and coil structure

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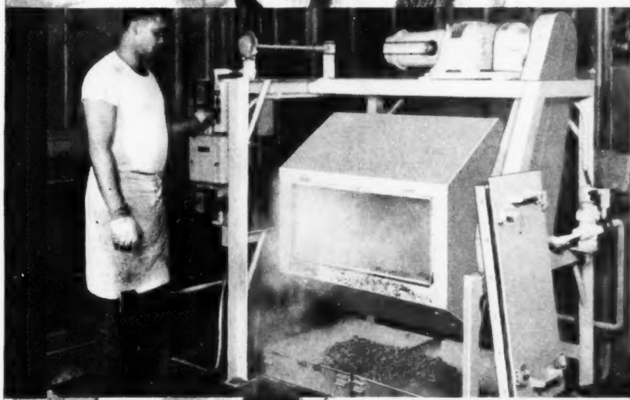

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NEW MATERIALS

Catalin Antioxidants AC-5, AC-6

Two new antioxidants which, when used in low concentrations, provide effective and economical protection against oxidative degradation in polymeric materials have been announced by Catalin Corp. of America, New York, N. Y. Called AC-5 and AC-6, the former is 2,2' methylenebis (4-methyl-6-tertiary-butyl phenol), and the latter is 2,2' thiobis (4-methyl-6-tertiary-butyl phenol). Both exhibit non-staining and non-discoloring properties in white and light-colored rubber products.

AC-5, when used in low concentrations of 0.25 to 1.5%, provides protection even in the presence of trace-metal contaminants in rubber products. The low volatility of AC-5 makes it applicable in high-temperature uses such as petroleum hydrocarbons and as an inhibitor of polymerization. Typical properties have been reported as follows: melting point, °C, 125-133; % ash, 0.05 max.; odor, slightly phenolic; color and form, white crystals; bulk density, lbs./cu.ft., 13.3; and screen analysis, 99.9% through 100 mesh, 95% through 200 mesh.

AC-6 is a new low-melting antioxidant which protects polymeric materials at high temperatures and incorporates easily in rubber, polyethylene, impact grades of polystyrene, petroleum hydrocarbons, waxes, and other materials in which high temperatures are a factor in processing and in end-use. Typical properties of AC-6 are given as: melting point, 82 to 88° C.; ash, 0.05-0.10%; vapor pressure at 200° C., 3 mm.; soluble in alcohols, hexane, acetone, toluene, ethylene dichloride, mineral oil; form and appearance, fine powder, off-white crystals; and storage stability, excellent. AC-6 is available in pilot-plant quantities.

Technical bulletins on both of these antioxidants are available from the company.

PRD-90, PID-90, PGD-25 Dispersions

Solid form dispersions of red lead in polyisobutylene, PRD-90; of sublimed litharge in polyisobutylene, PLD-90; and of p-quinone dioxime, (GMF), together with Whitetex clay in polyisobutylene, PGD-25, especially designed for use in insulated wire and cable compounds, have been announced by Wyrough and Loser, Trenton, N. J.

These high-concentration, solid dispersions in polyisobutylene binders are said to have many advantages over the ingredients in the powdered form in eliminating hazards to operating personnel, providing for quick incorporation with improved dispersion of the materials in the compounds, and in reducing the danger of scorched compounds.

These dispersions are compatible with all commercial elastomers including butyl, neoprene, styrene-butadiene rubber, and Hypalon, and the polyisobutylene has no effect on cure or final physical properties. The ratio of ingredients makes for easy recipe calculation.

Chemlok 401 for Textiles

A new industrial adhesive, which bonds Dacron and nylon to natural rubber, SBR, neoprene, butyl, and nitrile elastomers, has been announced by Lord Mfg. Co., special products division, Erie, Pa. Chemlok 401, a two-part adhesive is comprised of Chemlok 401-2, the adhesive, and Chemlok 401-1, the curative. Chemlok 401-2 is a solution of polymeric constituents and dispersed pigments in trichloroethylene which, when mixed with Chemlok 401-1, an isocyanate curative, forms a high-strength structural adhesive.

Fabrics bonded within two or three days after application of the adhesive require only a single coat of the two-part adhesive combination. For most applications 8% to 15% pick-up of adhesive based on the weight of the untreated fabric will give satisfactory results. The adhesive must be dried at a temperature not less than 180° F. before the fabric can be stored or bonded to the rubber stock. If fabrics are stored for more than three days, an additional secondary or tack coat of the rubber stock in organic solvent must be applied over the dried adhesive, and this tack coat dried at either 180° F., or at room temperature if time and storage space permit.

Room temperature strip adhesion values exceed 100 pounds per linear inch, depending upon the strength of the elastomer compound, it is said.

A technical bulletin, No. 4003, on Chemlok 401 may be obtained from the Lord company.

Bunac KS Rubber Reclaim Oil

An easily handled stabilized liquid rubber reclaiming oil designed as a replacement for solid rosin in the rubber reclaiming process has been introduced by the industrial chemicals division of Olin Mathieson Chemical Corp., New York, N. Y. Called Bunac KS rubber reclaiming oil, it is said to be suitable for use in both the pan and the digester reclaiming processes.

In the pan process, the oil disperses better through the ground rubber than solid rosin, and also has less tendency to coalesce during the heating process, according to the company.

Giving a higher tensile strength and lighter color to the reclaim, the oil is also said to produce a finished reclaim with properties comparable to those obtained with solid rosin. The dark-brown liquid is available in 55-gallon steel drums and in tank cars. Custom made for a single user for several years, it is now offered for general sale.

Some physical properties of Bunac KS have been reported as follows:

Acid number as abietic acid, min	125–140
Viscosity @ 100° F., cp., max	275
Pour point, °F	40
Flash point, min. °F	370
Specific gravity @ 60°/60° F.	0.97–1.00
Pounds per gallon	8.1–8.3

A technical bulletin on Bunac KS is available from the company.

Anti-Adhesive Silicone Coatings

Two new anti-adhesive silicone treatments for paper and paperboard, particularly as bag liners for raw synthetic rubber, have been announced by Dow Corning Corp., Midland, Mich. Identified as Dow Corning 22 and Dow Corning 23, they are said to impart "the highest order of surface resistance to tacky or sticky materials ever developed." They may be applied with conventional equipment to a wide range of paper and paper-like materials, including kraft, parchment, glassine, and cellophane. The concentration of silicone may be varied to suit the paper being treated. Curing schedules range from 10 seconds at 350° F. to two minutes at 235° F., according to the company.

Other applications include coatings for interleaving sheets for cured-in-place polyurethane foams, epoxy castings and phenolic laminates, and back-up sheets for labels and pressure-sensitive tapes. As a release coating for synthetic rubber bag liners, it is said to be even effective with butyl rubber, regarded as one of the stickiest materials in common use.

Dow Corning 22 is a water dilutable silicone emulsion containing 40% solids, milk-white in color, to which a catalyst, Dow Corning XEY-21, has been added.

Dow Corning 23 is a 30% silicone solution in xylene, ranging in color from colorless to light straw, with a specific gravity of 0.83-0.85, and a flash point of 75-95° F. The product can be thinned with xylene or other aromatics, heptane, ethyl acetate, or methyl ethyl ketone.

Details of applying the two silicone coatings are contained in two issues of the company's technical publication, "Silicone Notes," References 8-236 and 8-234.

Picco Latex Plasticizer A-12

An anionic emulsion developed as a modifier and extender for both curing and non-curing latex systems has been placed on the market by Pennsylvania Industrial Chemical Corp., Clairton, Pa. Called Latex Plasticizer A-12, the material is compatible with natural, neoprene, styrene-butadiene, styrene-acrylonitrile, and acrylic latices. It exhibits good softening and plasticizing properties and displays good aging characteristics and excellent resistance to water and alkalies, according to the company.

A-12 is recommended for use in back sizing of decorative fabrics and carpeting; back filling of bagging, tag, and book cloths; adhesives, tie coats, and laminates; and in resin plasticizing.

Physical properties of Latex Plasticizer A-12 have been reported as follows:

Particle size	less than 1.0 micron
Viscosity	55 to 60 K. U.
pH	9.0
% Solids	48–51
% Ash	Trace
Mechanical stability	>10 min. (Waring blender)

G-E Heater Duct Silicone Rubber

A silicone rubber cloth coating compound designed specifically for the manufacture of heater ducts has been announced by the silicone products department of General Electric Co., Waterford, N. Y. Designated SE-701, it has an operating temperature range of from —120 to 600° F. SE-701 is available only as an uncatalyzed compound, designated SE-701U. In use on Douglas Aircraft, it is said to have withstood 1,000 hours' exposure to air ranging from 350 to 700° F. at pressures up to 150 psi.

Other characteristics claimed for it include improved flame retardancy, outstanding heat resistance with low weight loss and resistance to softening, and excellent penetration of cloth, adhesion to glass cloth, building tack, and ease of curing, and improved compression set.

SE-701 can also function as a compound for prime coating glass cloth to improve the adhesion of other silicone rubber compounds to the base cloth and as an adhesive for the bonding of silicone rubber to itself and to other non-silicone surfaces.

Red as an uncured compound, SE-701 has a specific gravity of 1.5, weighs 12.5 pounds per gallon, and is soluble in toluene and xylene, among other solvents.

Pliolite VT

A vinyl toluene/butadiene resin developed specifically as a solution binder for coatings has been placed on the market by the chemical division of The Goodyear Tire & Rubber Co., Akron, O. Designated Pliolite VT, the resin is of a thermoplastic nature, is odorless and tasteless, and white in color. Films of unusual clarity, strength, hardness, and chemical resistance can be made from it, according to the company. These films are formed by evaporation of solvent, with rate of drying depending on the solvent used. The new resin is not an oxidizing type of binder.

Solubility in aliphatic solvents is said to be one of the outstanding features of Pliolite VT. For example, the resin goes into solution in solvents having Kauri Butanol values as low as 36.

For dispersion of pigments into Pliolite VT solutions, dispersion equipment used by the coating industry can be employed. Pliolite VT solutions have a good wetting effect on pigments, the company says.

Suggested end-use applications of the resin include traffic paint, paper coatings, adhesives, laminates, printing inks, hot melts, and abrasion resistant coatings.

Some reported physical properties of Pliolite VT follow:

Specific gravity	1.026
Bulk density, lbs./cu. ft.	25.7
Pounds/gallon	8.56
Index of refraction	1.577
Softening point	45 ± 3° C.

Thiokol Liquid Polymer LP-31

A new, high molecular weight, liquid polysulfide polymer which may be cured in place at room temperature to form solid rubbers has been introduced by Thiokol Chemical Corp., Trenton, N. J. Designated LP-31, the polymer is cured by converting its thiol terminals to disulfide bonds by the use of oxygen-donating materials such as lead dioxide and cumene hydroperoxide. Other curing agents which may be used include metallic oxides, organic peroxides, metallic paint driers, and aldehydes.

LP-31 can be compounded with a wide variety of reinforcing agents and extending pigments to increase its strength and reduce compounding costs. For soft compounds, plasticizers, both of the ester and resin types, may be used where the physical property requirements are not too stringent.

Adhesive properties are developed through the use of phenolic resins which are incorporated at the same time that the fillers are added. Since plasticizers hamper adhesion, it is recommended that solvents such as xylene or toluene be substituted to obtain high fluidity where required. The liquid polymer can be compounded to yield a strong elastic bond to glass, ceramics, aluminum, wood, steel, plastics, fibers, lead, copper, brass, and synthetic and natural rubbers.

A summary of the physical properties claimed for the unconverted liquid polymer include:

Specific gravity at 20°/20° C.	1.31
Viscosity at 25° C., poises	800-1,400
Average molecular weight	7,500
Pour point, °F.	40-65
Flash point, °F. (open cup)	455
Fire point, °F. (open cup)	478
pH (water extract)	6.0-8.0
Moisture content, %	0.2 max.
Stability	over three years.

A bulletin describing Thiokol LP-31, giving its structure, compatibility with solvents, and curing mechanisms is available on request from the company.

Opalon 71344

A polyvinyl chloride compound, especially formulated for use as primary insulation on aircraft wire, has been introduced by Monsanto Chemical Co.'s plastics division, Springfield, Mass. Called Opalon 71344, this material is said to be suitable for use in temperatures ranging from —55 to 105° C. and to possess good extrusion characteristics. A data sheet is available on request.

Some physical properties of Opalon 71344 follow:

Tensile strength	3000 psi.
Elongation	340%
100% Modulus	2400 psi.
Durometer hardness C	68 (94 Shore A scale)
Specific gravity	1.365
Volume resistivity	40 x 10^{12}

Magnetic Flow Meter

(*Continued from page 878*)

field disturbed by the latex flow. The resulting emf. is picked up by the electrodes and recorded on an electronic recorder.

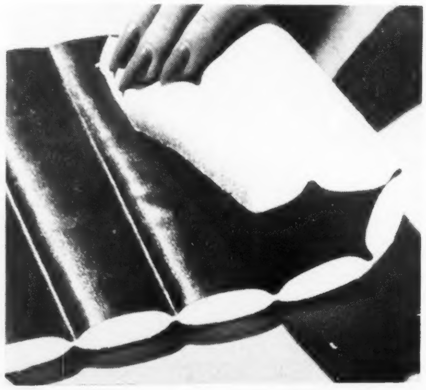
The instrument is mounted in a by-pass to the main flow line and provided with blind flanges to permit insertion of a cleaning brush. Since the meter responds only to average velocity, variations in the flow profile resulting from the pipe tees and valves of the by-pass have no effect on its accuracy.

Reports from the field indicate an even greater accuracy than the manufacturer claims of ±1%. One such installation, operating for four months in a butadiene-styrene emulsion, gave less than a six-pound error in a 2,000-pound delivery—an accuracy of ±0.6%.

The electronic recorder with which the meter is used consists of an electrical bridge, self-balancing type of potentiometer which requires only routine inspection.

A hose that takes extremes of heat and cold without cracking; attachable tire side-wall rings in white and a variety of colors for *extra* beauty in today's cars; and boots with superior resistance to weather and wear . . . all through the use of Enjay Butyl.

NEW PRODUCTS



Naugafoam Upholstery Material

Elastic Naugahyde Upholstery

A new line of textured Elastic Naugahyde vinyl upholstery has been introduced by United States Rubber Co., New York, N. Y. Called Coven, it is being offered in eight multiple print colors: coral, grey, mocha, olive, cerulean, lemon, cantaloupe, and green. This material is available in a width of 54 inches. Coven has elastic fabric backing which makes it easy to use when upholstering furniture with contours, the rubber company says.

The line is recommended for upholstering dinette seats, dining room chairs, davenports and chairs in family rooms, and for seating in hotels, restaurants, and other institutions.

Latex Foam-and-Vinyl Upholstery

An upholstery material made of a latex foam rubber core, vinyl cover, and a backing of cotton sheeting also is being marketed by U. S. Rubber. Named Naugafoam, it is said to combine the resiliency of foam rubber with the color, durability, and easy-to-clean features of vinyl. The three materials are heat-sealed. The upholstery is shaped into quilted channels 1¼ inches wide. The foam rubber is ⅜-inch thick at its thickest point; the vinyl is the 25-ounce grade.

Suggested applications are in upholstering chairs, sofas, ottomans, bolsters and cushions, boat seals, door panels of cars, and restaurant booths. The upholstery is 54 inches wide and is being sold in 15-yard rolls. Colors available are crimson, yew green, ginger brown, black, and parchment.

New Boston Water Hose

Two new items in the industrial water hose line are being offered by the Boston Woven Hose & Rubber Co., Division of American Biltrite Rubber Co., Inc., Cambridge, Mass. These items are primarily designed to handle the varied industrial water discharge requirements, with maximum economy. Boston Industrial Water Hose is available in a large selection of sizes. Boston Performer Air-Water Hose is designed to meet the need of water discharge applications where moderate pressures are required, and for air service where oil resistance is not a factor.

Complete information and specifications on these two new Boston hoses, and the complete line of Boston water hose, is included in a new catalog, available free of charge from the company.

Borden Polyethylene Matting

An extruded polyethylene ribbed matting designed to replace conventional rubber matting in factories, homes, hospitals, and theaters has been developed by the chemical division of Borden Co., New York, N. Y. Called "Perma-Mat," it is described as a tough, economical, non-skid, transparent material. Available in rolls 30 inches wide and six, 50, and 100 feet long, it can be cut with scissors. It is reversible.

Firestone DeLuxe Super Champion Tire

A nylon cord replacement tire with high-speed characteristics is being marketed by The Firestone Tire & Rubber Co., Akron, O. One feature of the tire is that it is designed to withstand hot summer driving on turnpikes and other vacation routes.

Called DeLuxe Super Champion, the new passenger tire is reinforced with speedway tested nylon cord. The company's original "bladed" tread is said to provide longer mileage and better traction and to hold squeal and whine to a minimum.

Firestone's recently developed "speedway weld" is the basic construction feature of this new tire. Heat resistant tread compound, improved synthetic rubber, and high adhesion stock are used in the tire's construction.

Goodyear Refinery Steam Hose

A steam hose designed for use by oil refineries has been announced by The Goodyear Tire & Rubber Co., Akron, O. Called Flexsteel 150 Refinery, the new hose is covered with neoprene for oil, weather, and age resistance and is reinforced with steel wire braid. Available sizes are ½-, ¾-, and one-inch inside diameters. The hose has a saturated steam maximum working pressure of 150 pounds.

Seiberling Rubber Heel with Plastic Core

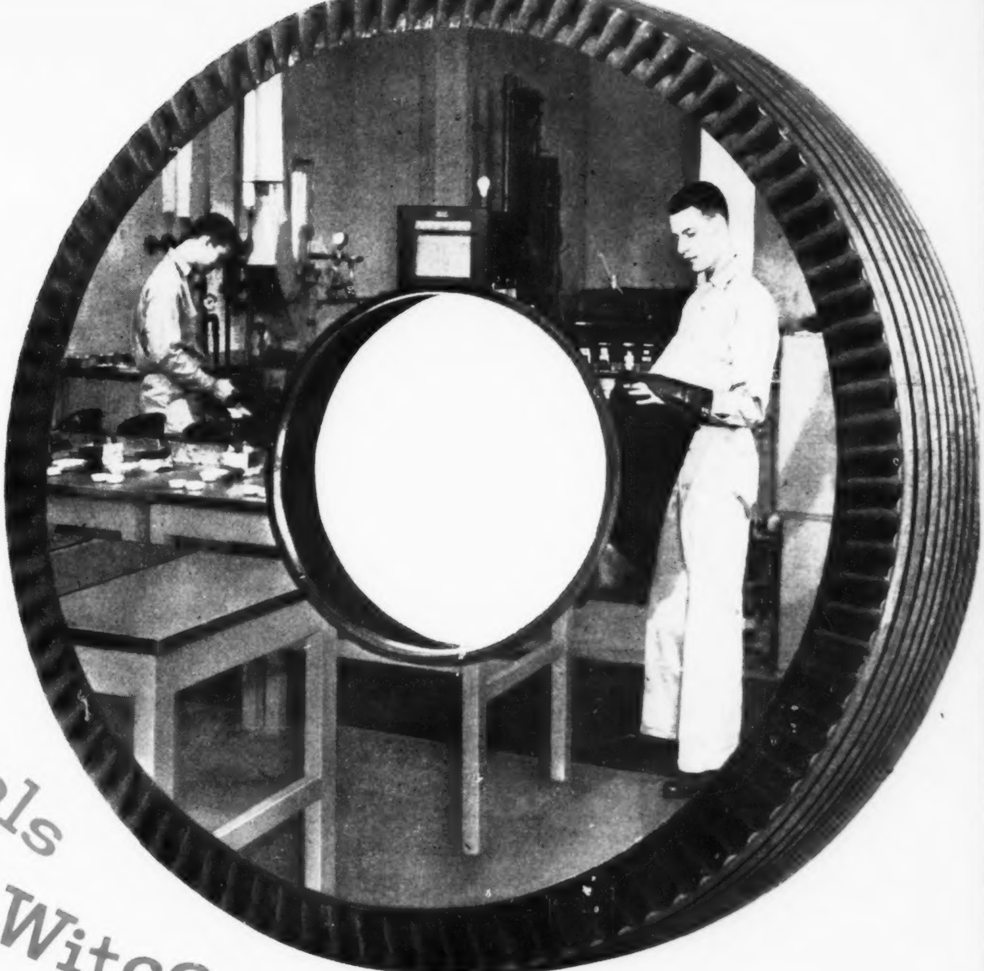
A men's shoe rubber heel with a core of flexible plastic has been developed by The Seiberling Rubber Co., Akron, O. Called Softy, it is said to be the first successful product of its type and the first to be marketed nationally.

The plastic core is designed to grip nails securely when the heel is applied to a shoe. Conventional heels have wood cores or metal washers which are costly to assemble and difficult to place accurately, according to Seiberling. The wooden cores, popularized during World War II, tend to split and splinter, particularly when the heel wears down and water or moisture seeps in. The plastic core in the new Seiberling heel is moisture-resistant.

Anatherm Heat-Resistant Film-Coated Wire

Anatherm—the first polyester film-coated magnet wire to be offered under the new Class F (155° C.) rating established by the American Institute of Electrical Engineers—has been developed by the Anaconda Wire & Cable Co., Muskegon, Mich. The new product supplements Anaconda's line of Class B epoxy enamel magnet wire. Anatherm's high level of thermal stability makes it especially valuable to manufacturers of motor, transformer, and electronic equipment, it is claimed. This wire complies with Underwriters Laboratories requirements for magnet wire to be used in Class B motors and transformers and is available in single and heavy film thickness in AWG sizes from 15 through 25. A technical bulletin is available from the manufacturer.

"Flexaust Hose." Bulletin 70. Flexaust Co., New York, N. Y. 6 pages. Specifications and prices of the company's Flexaust hose and Portovent duct products are given in this tabbed, illustrated catalog.



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TECHNICAL BOOKS

BOOK REVIEW

"Engineering Uses of Rubber." A. T. McPherson and Alexander Klemin, Editors. Reinhold Publishing Corp., New York, N. Y. 1956. Cloth cover, 6 by 9 inches, 490 pages. Price $12.50.

This book was originally planned by the late Alexander Klemin, eminent aeronautical engineer, to provide information and data on rubber which are needed by engineers outside the rubber industry concerned with applications of the material in design problems. He had secured the cooperation of many of the authors and had some of the manuscripts in hand when death intervened. The work was completed by A. T. McPherson, associate director, National Bureau of Standards, who had been working with Dr. Klemin on many of the technical aspects pertaining to rubber. The text, comprising 14 chapters, was written by 18 outstanding rubber technologists chosen because of expert knowledge in their respective fields. In addition, an introductory chapter provides historical and statistical background, and a concluding chapter deals with the relation between the structure of polymers and their rubber-like properties.

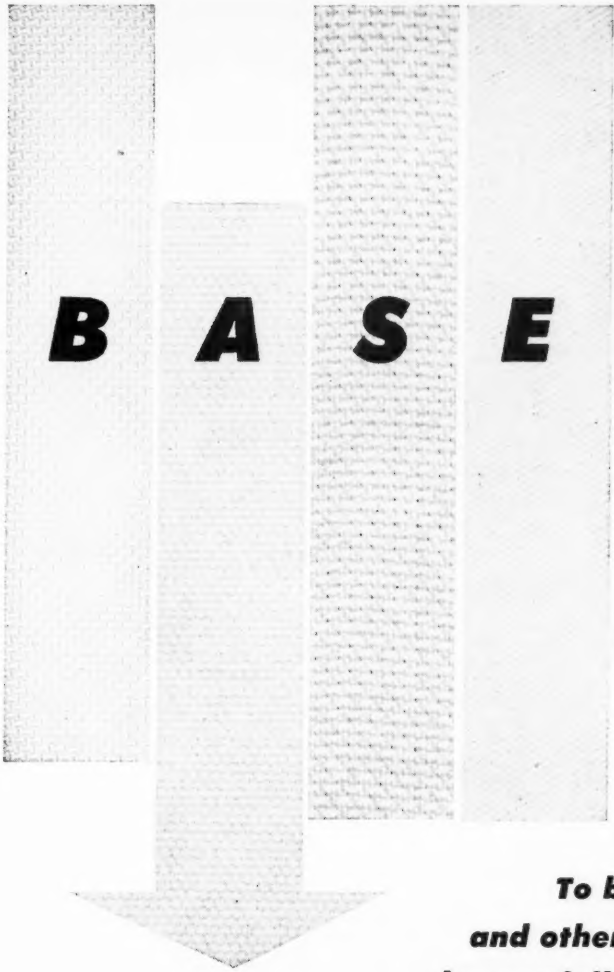
As Dr. McPherson states in his preface, the book covers four major areas, the manufacturer of rubber goods, the properties and behavior of rubber, applications in different industries, and means of obtaining rubber products either by specification purchase or by special construction. The two chapters dealing with manufacturing processes such as mixing, calendering, spreading, and vulcanization are of most value to the engineer outside the rubber industry in enabling him to understand why rubber products behave as they do and what changes can be made in them economically.

The three chapters dealing with the properties and behavior of rubber provide fundamental information on physical properties and resistance to deterioration on which most engineering uses depend. "General Engineering Properties of Rubber," by E. G. Kimmich, Goodyear Tire & Rubber Co., summarizes in an excellent manner the physical characteristics of the material and the methods used for their measurement. "The Design of Rubber Mountings," by J. F. Downie Smith, Iowa State College, deals quite fully with the elastic properties important to uses of rubber in springs and for vibration absorption, including specific design formulas for various mountings in shear, torsion, and compression. The chapter on "Deterioration of Rubber from Use and with Age," by J. Crabtree and F. S. Malm, Bell Telephone Laboratories, is a very complete discussion, in light of present knowledge, of the causes and extent of deterioration under service conditions and of the methods of testing the susceptibility of rubber compounds to such deterioration.

Of the seven chapters covering the applications of rubber in industry and transportation, three deal with specific branches of engineering: namely, civil, chemical, and electrical, and two with uses in automobiles other than tires and in aviation. Separate chapters are devoted to tires and belt conveyors. Outstanding in their scope and presentation of information either not available or difficult to find elsewhere are the chapters on "Rubber in Electrical Engineering," by G. J. Crowdes, Simplex Wire & Cable Co., and on "Tires" by R. H. Spelman, The General Tire & Rubber Co.

The subject of means of obtaining rubber products having desired properties is covered in two valuable and unusual chapters, the first of which is a very complete discussion of specifications and inspection of products purchased from manufacturers, and which gives many pertinent instructions on the preparation and content of such specifications and provides abundant references to existing specifications and other source material. The other chapter is a very practical presentation of procedures whereby rubber articles needed for new and special purposes may be procured or made by engineers outside the rubber industry.

Probably it is inevitable in a text prepared by so many



different authors that there should be some repetition, but the superior editing job done by Dr. McPherson has reduced this situation to a minimum. Also, the time required for preparation of a book of this type makes it difficult to keep up with such a rapidly changing field as rubber technology, and more information could be desired on some of the newer materials such as the polyurethanes and the chlorosulfonated polyethylenes. Finally, the engineering uses of rubber are so numerous that all could not be completely covered in a book of reasonable size; however, the fields which have been chosen and very ably treated are probably those in which engineering information is most difficult to obtain or which have great economic importance.

The book is well indexed, attractively printed and bound, and is very free from typographical or other errors. It definitely represents a new approach to the subject and seems not only to have accomplished Dr. Klemin's original objective with respect to engineers outside the rubber industry, but also to be invaluable to all engineers and users of rubber products both for reference and as a source book of information for development purposes.

ARTHUR W. CARPENTER

NEW PUBLICATIONS

"Neville Chemicals for Adhesives." Neville Chemical Co., Pittsburgh, Pa. 28 pages. The object of this booklet is to illustrate the usefulness and versatility of the company's chemicals in adhesives, which, when correctly compounded, can be employed in the bonding of such materials as wood, paper, aluminum foil, glass, rubber, plastics, and various other materials to themselves or to each other. Written for adhesive formulators, this bulletin gives a list of examples showing a specific formulation for a typical application, along with a brief description of the formulating procedure. With each of the 66 formulae listed are given its components, its applications, and its specific type of adhesive application.

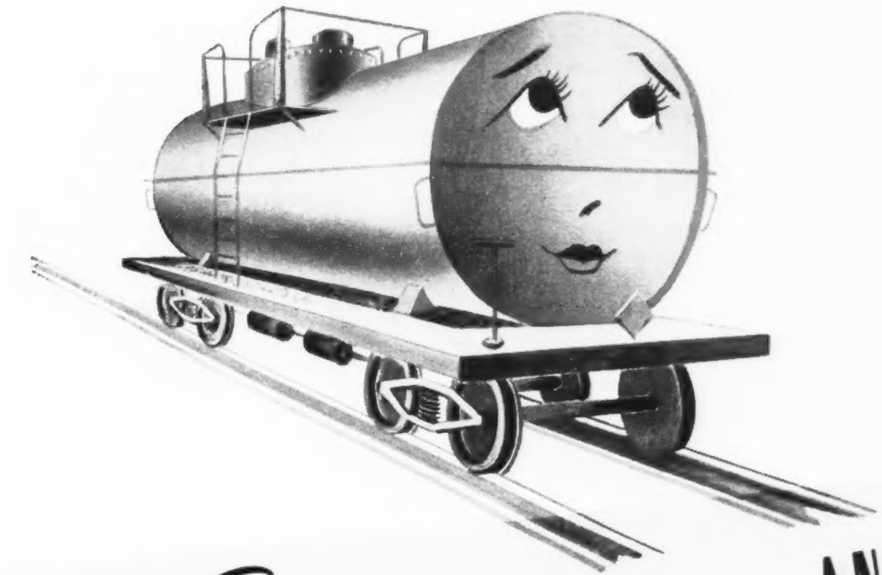
"Philprene Polymers." Phillips Chemical Co., Akron, O. 38 pages. This booklet supplies technical data and practical compound information pertaining to the company's SBR rubbers, which include hot and cold types, pigmented, non-pigmented, oil-extended, and many special types such as low water-adsorption polymers for the wire and cable industry. Described are various styrene-butadiene copolymers as well as some styrene-butadiene copolymers cross-linked with divinylbenzene.

"Silene EF Ingestion Studies." Silene Bulletin No. 4. Columbia-Southern Chemical Corp., Pittsburgh, Pa. 3 pages. This report on the effects of ingestion of the company's Silene EF, a precipitated, hydrated calcium silicate of very fine particle size, on dogs and rats says that few harmful effects were noted in these animals even at a 10% dietary level. By extension, the material is declared harmless to human beings in food products at specified levels and to industrial workers handling the compound.

"Butanol." Union Carbide Chemicals Co., division of Union Carbide Corp., New York, N. Y. 12 pages. Properties, applications, specifications, solubility, constant boiling mixtures, and other data on the company's butanol are included in this booklet. Butanol is widely used in the manufacture of plasticizers, resin intermediates, lacquers, and varnishes.

"Silastic Silicone Rubber." Code #9-106. Dow Corning Corp., Midland, Mich. 6 pages. Properties and mechanical parts applications of the company's silicone rubbers are discussed in this new illustrated brochure.

"Corrosion Proofing." Pennsalt Chemicals Corp., corrosion engineering department, Philadelphia, Pa. 8 pages. This revised edition of the company's corrosion proofing brochure outlines the selection of the best corrosion proofing methods and products, the determining of the comparative resistance of various cement mortars, and the calculation of quantities needed.



Publications of Harwick Standard Chemical Co., Akron, O.:

"Stan-Tone GPE Colors." Bulletin #02-134-3-5-57. 2 pages. Specific gravity and pigment type of these company-distributed colors, which consist of a coloring pigment completely dispersed in low molecular weight polyethylene, are given in this listing.

"Thixon 11164." Bulletin #03-5-3-5-57. 3 pages. Properties and application of this adhesive for the vulcanization bonding of neoprene to brass plate and primed metals are included in this data sheet. A neoprene recipe is suggested.

"Plasticizer DP-200." Bulletin #P-07-128A-1-6-57. 3 pages. The characteristics and properties of this Harwick Standard-distributed ester-type plasticizer which imparts excellent low-temperature flexibility properties to synthetic rubbers and vinyl resins are presented in this publication. Included are test data based on a vinyl chloride resin recipe incorporating Plasticizer DP-200.

"Plasticizer DP-250." Bulletin #P-07-128B-1-5-57. 5 pages. The properties of this low-viscosity polyester plasticizer recommended for vinyl compounding, in outside weather goods, in wire and cable, for pigment grinding, among other applications, are discussed here. Its performance in vinyl chloride-type resin is compared with that of other commercially available polymeric plasticizers.

"Thixon AM [manufactured by Dayton Chemical Products Laboratories, Inc.]: Rubber-to-Metal Bonding Adhesive." 2 pages. This bulletin describes the composition, properties and applications of Thixon AM, a special compound of rubber and chemical derivatives in volatile solvent whose function is the vulcanization bonding of butadiene-acrylonitrile copolymer stocks to metals.

"Thixon IB-2 [manufactured by Dayton Chemical Products Laboratories]: Rubber-to-Metal Bonding Adhesive." 2 pages. This bulletin describes the composition, properties, and applications of Thixon IB-2, a special compound of rubber and chemical derivatives in volatile solvent whose function is the vulcanization bonding of butyl compounds to brass plate and primed metals.

Publications of E. I. du Pont de Nemours & Co., Inc., elastomer chemicals department, Wilmington, Del.:

"Industrial Rolls of Hypalon 20." P. F. Bertsch and J. B. Knox. Report 57-8. 26 pages. The properties and applications, the compounding and processing, the roll building, the curing of rolls, and the finishing and storage of Hypalon rolls are presented in this booklet. Its heat, chemical and oxidation resistance, combined with outstanding ozone, abrasion and wear resistance, enable industrial rolls of Hypalon to be used in an unusual range of services which are also described.

"Zalba." H. Fishman and R. W. Bell. Report 57-9. 20 pages. This report contains compounding information and emulsification recipes for Zalba, a non-staining, non-discoloring member of the hindered phenol class of antioxidants which affords protection against heat and oxidative degradation for natural and synthetic rubber. Zalba is also reported to function as a non-staining, non-discoloring stabilizer for the manufacture of SBR polymers.

"Improved Neoprene Products for the Oil Drilling Industry." M. A. Schoenbeck. Report No. 57-7. 16 pages. Neoprene recipes for a variety of oil drilling products, together with suggestions for compounding, are included in this booklet. Test data on these products and stress relaxation graphs are also given. There are photographs of the products discussed.

"Polyac—A Chemical Conditioner for Butyl Elastomers." J. J. Gorman. Report BL-324. 2 pages. Recipes are presented here for butyl stock incorporating small amounts of Polyac (25% poly para dinitroso benzene), which improves the rubber's resilience, increases its modulus, decreases its hardness, improves its low-temperature properties, and eliminates the cold flow of the uncured stock.

"Hypalon 20 in White Sidewalls for Tires." J. E. Middleton, Jr., and M. F. Torrence. Report BL-325. 4 pages. A recipe for a neoprene-Hypalon-natural rubber blend that is said to give white sidewalls of superior quality appears in this report, together with postcure test data and suggestions for compounding of the stock.

"Neoprene Latex Type 650." R. O. Becker. Report BL-326. 4 pages. Reported here are the physical properties and general characteristics of Neoprene Latex Type 650, the concentrated form of Neoprene Latex Type 750, which can be used where a high-solids general-purpose neoprene latex is desired. The latex can be used to make low- or high-modulus dipped or molded goods and soft, resilient foam products.

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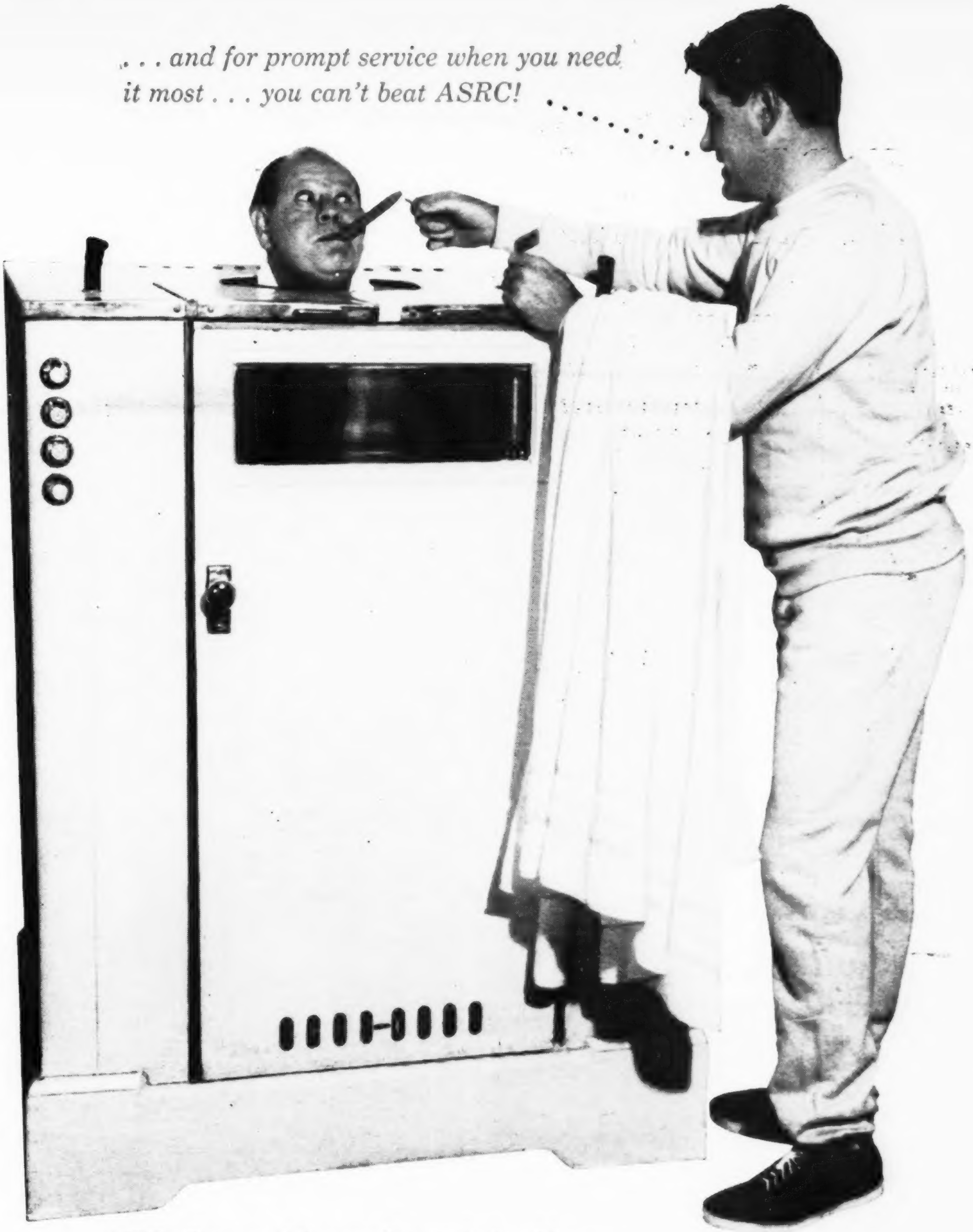

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ASRC 1500	Staining	ASRC 1000	Staining
ASRC 1502	Non-Staining	ASRC 1001	Slightly Staining
ASRC 1503	Non-Staining	ASRC 1004	Staining
ASRC 3110	Non-Staining	ASRC 1006	Non-Staining
COLD OIL		ASRC 1009	Non-Staining
ASRC 1703	Non-Staining	ASRC 1018	Non-Staining
ASRC 1708	Non-Staining	ASRC 1019	Non-Staining

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Publications of Thiokol Chemical Corp., Trenton, N.J.:

"Evaluation of Butyl Accelerators—Sulfur Type Cure: Part II, Thiuram Type." Bulletin 100-1. 3 pages. This second part of a study on sulfur cures for butyl rubber treats of the thiuram types. Ten concentrations and combinations of thiuram types were tested in standard ASTM procedures. Test data and conclusions based on these data are reported here.

"Evaluation of Butyl Accelerators—Sulfur Type Cure: Part III, Carbamate Type." 6 pages. This third and final part of the study investigates the carbamate types of accelerator which are considered the most active of the sulfur-type accelerators in butyl. Reported test data indicate that carbamates should be used principally where a fast rate of cure may be desired, as in curing of molded goods, belting, or packing.

"Thiokol Facts." Vol. 4, No. 1. 12 pages. Recent applications of the company's liquid polymers, polyurethanes, butyl rubber, solid rocket propellants, and electronic equipment are discussed and illustrated in this Thiokol house organ, which will now be published regularly after an absence of 13 years. Included here are articles on liquid polymer-based sealants for aluminum/glass structures, rubber-coated gas tanks for race cars, National Electronics Laboratories' equipment for jet aircraft auto-pilot testing, the design and functioning of rocket engines, and a butyl rubber backstop for bowling alleys.

Publications of Goodyear Tire & Rubber Co., Akron, O.:

"Compounding Study: Reduction of Tack in Pliovic AO Plastisols." Tech-Book Facts 57-109. 4 pages. Additives for the reduction of tack in Pliovic AO Plastisols are discussed in this issue. The study also indicates the influence of these additives on other plastisol properties.

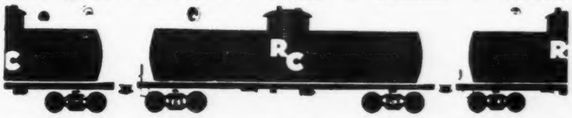
"Formulating with Medium Viscosity Vinyl Resin—Pliovic S70." Tech-Book Facts 57-144. 2 pages. Starting formulations based on Pliovic S70, a new low viscosity vinyl polymer, for application in film and sheeting, flooring, and for high-gloss extrusions are provided in this publication.

"Compounding with Pliolite S-6B Styrene Rubbers." Tech-Book Facts Bulletin 57-47. 20 pages. This bulletin summarizes the effect of this rubber reinforcing resin, Pliolite S-6B, in hot, cold, and oil-extended styrene rubbers. Graphic illustration of data shows at a glance what happens to tensile, hardness, flex, and abrasion throughout the effective range of resin addition.

"The Reclaimator." U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. 16 pages. This photographically illustrated booklet describes the development and the principles of the Reclaimator process—a continuous passage of vulcanized rubber through a heated chamber—which devulcanizes rubber after which it is finished as (1) sheeted reclaim, (2) extruded reclaim, or (3) powered reclaim, and can be made ready for shipment in much less time than with some other processess. The process is claimed to be the fastest, lowest-cost, highest-quality method of producing reclaimed rubber yet devised. The patented machine is being licensed in various countries of the world.

"Mixing, Grinding, and Dispersing Equipment." Charles Ross & Son Co., Inc., Brooklyn, N. Y. 4 pages The latest types of mixing, grinding, and dispersing equipment for all types of applications are illustrated and described in this new brochure, #3C. Among the new units included is the double planetary-type change can mixer (available in 1-150-gallon sizes) with vertical hydraulic raise of stirrers and variable-speed control of mixing. Another is an improved high-speed dissolver or disperser, with sawtooth disk-type impeller and variable-speed control providing up to 8,000 fpm. for maximum impact and shear. Simplified one-point hydraulic adjustment and pressure indicating gages are features of the improved high-speed three-roller mills. Illustrations and specifications are also provided for heavy-duty double-arm kneaders; mixers for heavy paste, medium paste, or liquid materials; disintegrators or Cage mills; horizontal paddle-type mixers; and many other types of Ross processing equipment. This new brochure, #3C, is available free upon request from the company.

"Combustible Dust Hazards in the Plastics Industry." The Society of the Plastics Industry, Inc., New York, N. Y. 4 pages. Methods of preventing plant fires due to combustible plastic dusts are outlined in this publication.



MARKET REVIEWS

Natural Rubber

The July 16-August 15 trading period witnessed a continuation of the lull in natural rubber market activity. Spot prices in New York, fluctuating less than 1¢ a pound, nearly duplicated the differentials noted in the previous period. Contracts traded on the New York Commodity Exchange dropped to 14,870 tons.

Trade sources have been perplexed as to the factors underlying the continued steadiness despite the apparent inactivity in both the physical and terminal markets. While the behavior of the New York market has been attributed to a good factory off-take of physicals, the situation in the Far East indicates a certain volume of "invisible" business, which bypasses normal market channels, but still gives support to the general structure. There is a general feeling that direct contacts between consumers and Asian dealers in Malaya, Indonesia, and other producing countries are rapidly increasing at the expense of the normal functioning and interdependence of world rubber markets. Such transactions are difficult to trace at the time of placement, and indications are that business is probably much better than a survey of current known activities would indicate. This belief is borne out, to some extent, by the relatively high export total of 82,179 tons from Malaya during July, which represents an average turnover of about 3,600 tons per working day.

The strength of the off-grade market and the pressure of unwanted top grades have also contributed to the static condition. However a change for the better resulting from increased activity at the close of the holiday season is expected.

July sales, on the New York Commodity Exchange, amounted to 14,980 tons; while none occurred on the Rubber-Standard Contract. There were 23 trading days both during the month of July and the July 16-August 15 period.

Week-end closing Commodity Exchange future prices for the Rex Contract were as follows:

REX CONTRACT

	June 21	July 19	July 26	Aug. 2	Aug. 9
July	32.90	32.95	33.40	....	....
Sept.	32.40	32.70	32.60	32.50	32.55
Nov.	32.20	32.55	32.45	32.65	32.50
1958					
Jan.	32.00	32.45	32.38	32.60	32.40
Mar.	31.80	32.35	32.31	32.55	32.30
May	31.60	32.22	32.10	32.40	32.18
July	31.40	31.95	31.80	32.15	31.80
Sept.	....	....	....	31.95	31.60
Total weekly sales, tons	3,740	3,770	3,660	3,620	3,350

On the physical market, RSS #1, according to the New York Rubber Trade Association, averaged 32.73¢ per pound for the July 16-August 15 period. Average July sellers' prices for representative grades were: RSS #3, 32.25¢; #3 Amber Blankets, 29.25¢; and Flat Bark, 21.62¢.

	June 21	July 19	July 26	Aug. 2	Aug. 9
RSS #1	33.00	32.88	32.88	32.63	32.63
2	32.75	32.63	32.63	32.50	32.50
3	32.50	32.38	32.38	32.38	32.38
Pale Crepe					
#1 Thick	36.63	37.25	37.25	36.88	36.75
Thin	35.63	35.00	35.00	34.63	34.75
#3 Amber Blankets	29.50	29.38	29.13	29.00	....
Thin Brown Crepe	29.13	28.88	28.63	28.75	29.13
Standard Flat Bark	21.88	21.75	21.63	21.75	....

Synthetic Rubber

Consumption of synthetic rubbers in July totaled 69,383 long tons, as compared with 70,230 long tons consumed in June, according to the monthly report of The Rubber Manufacturers Association, Inc. This consumption figure is somewhat surprising in view of the general reduced level of production of rubber goods during the summer months because of vacation shutdowns, etc. Also of interest is the fact that the proportion of synthetic rubber to total new rubber reached a new high, at 63.46% in July. For the first seven months of 1957, synthetic rubber consumption accounted for 62.8% of the total, and some observers feel that the eventual proportion of synthetic to total new rubber will reach 70% in the not-too-far-distant future.

Consumption of synthetic rubbers during July according to types was as follows: SBR, 58,396 tons, against 58,341 in June; neoprene, 5,030 tons, against 5,798; butyl, 4,205, against 4,235; and nitrile, 1,752, against 1,856.

Production in July, according to types, as compared with June output, amounted to: SBR, 67,793, against 67,918; neoprene, 8,591, against 9,678; butyl, 1,972, against 4,379; and nitrile, 2,600, against 2,538.

Exports of synthetic rubber increased to 19,000 tons in July, compared to 17,125 tons in June. Exports of SBR rose to 15,000, from 13,400 tons in June; while neoprene exports at 2,400 tons were about the same as for June. The butyl rubber export figure for July was 1,200 tons, compared with 865 for June, and 400 tons of nitrile rubber went abroad in July and 475 in June.

With the outlook for business during the remainder of 1957 both at home and abroad considered good, domestic consumption and exports should increase still further in the coming months. Continued increases in demand for cold, oil-extended, and cold latices of SBR are also expected.

The demand for SBR black masterbatch and oil-black masterbatch may reverse in trend in view of the recently announced Columbian Carbon Co. latex masterbatch described elsewhere in this issue. Improved dispersion of black and improved tread wear in tires made of this-type masterbatch, in contrast to the conventional black masterbatch as reported by the company, hold promise of new interest in this type of SBR. The General Tire & Rubber Co. has announced plans to market this Columbian process masterbatch from its new SBR plant.

Latex

Demand for liquid latex remained steady throughout the July 16-August 15 trading period, with the off-take keeping pace with supply. A considerable amount of forward business has been done both in bulk and in drum latex, and a tight supply situation is anticipated during the last quarter of the year.

Prices for ASTM Centrifuged Concentrated natural latex, in tank-car quantities, f.o.b., rail tank cars, ranged during the period from 43-41.6¢ per pound solids. Synthetic latices were 21.5-32¢ for SBR; 37-47¢ for neoprene; and 46-54¢ for N-types.

Final May and preliminary June domestic statistics for all latices were reported by the United States Department of Commerce as follows:

(All Figures in Long Tons, Dry Weight)

Type of Latex	Production	Imports	Consumption	Month-End Stocks
Natural				
May	0	5,794	5,867	11,733
June	0	.....	5,447	10,832
SBR				
May	5,495	.....	5,114	7,885
June	5,251	.....	4,689	8,556
Neoprene				
May	1,082	0	814	1,407
June	819	0	754	1,318
Nitrile				
May	933	0	731	1,710
June	886	0	414	1,576

Scrap Rubber

Trading continued at a slow pace in the scrap rubber market during the period July 16-August 15, and no new factors have developed to brighten the business outlook. Naugatuck, which had been shut down since August 2, was expected to reopen on the 19th. Tubes have been moving slowly, and mixed auto tires are off $1.00 per ton from last month's quotation.

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$12.00	$12.00
S.A.G. truck tires	Nom.	Nom.
Peelings, No. 1	Nom.	Nom.
2	Nom.	Nom.
3	Nom.	Nom.
Tire buffings	Nom.	Nom.

CYANAMID RUBBER Chem Lines

NO. 12 OF A SERIES Published by AMERICAN CYANAMID COMPANY, Rubber Chemicals Department, Bound Brook, New Jersey

Non-Staining Antioxidants for White or Light-Colored Rubber

Applied to antioxidants for use in rubber products, the term "non-staining" describes those materials which: (a) themselves impart no color to the rubber product; (b) develop no color and produce no color change in the rubber product or on its surface when exposed to light or other aging conditions; and (c) impart no discoloration by transfer-staining to adjoining light-colored surfaces.

Even in the absence of an antioxidant, white or light-colored rubber products may show some discoloration or color change when exposed to light and aging. The problem, then, is the development of antioxidants which will greatly improve aging qualities and service life without accentuating this natural color change. Antioxidants which fulfill this condition may justly be called "non-staining" antioxidants.

The best non-staining antioxidants belong to the class of chemicals known as phenols. This class of antioxidants seems to be expanding, and several new products have been added in recent years. They are not uniformly good, however, for phenolic-type chemicals vary in their antioxidant activity from "slight" to "very good"; they also vary in the degree of discoloration produced in the rubber. The ideal is, of course, an antioxidant which is highly effective in extending the storage or service life of the rubber product while causing no discoloration or color change whatsoever. While this ideal balance has not yet been achieved, several phenolic antioxidants give performances closely approaching it.

In a test designed to show their relative effectiveness, six typical phenolic-type antioxidants were examined against Cyanamid's Antioxidant 2246® and Antioxidant 425®.

Product A (in ratios of 0.5 to 1.0 %/RHC) gave only fair protection against normal aging, together with slight discoloration on exposure to sunlight.

Product B (in ratios of 0.25 to 1.0%) gave moderate protection against oxidation, flexing and frosting, with a small amount of discoloration on exposure to sunlight.

Product C (in ratios of 1.0 to 2.0%) gave practically no discoloration, but only mild protection against oxidation.

Product D (in ratios of 1.0 to 2.0%) also gave practically no discoloration, but only mild protection against oxidation.

Product E (in ratios of 1.0 to 2.0%) gave very good protection against oxidation, but with a small amount of discoloration on exposure to sunlight.

Product F (in ratios of 1.0 to 2.0%) also gave very good protection against oxidation, with very slight discoloration on exposure to sunlight.

Antioxidant 2246 (in ratios of 0.25 to 2.0%) gave very good protection against oxidation, proved beneficial against flexing and surface oxidation induced by light, and produced only a slight amount of discoloration in white rubber on exposure to sunlight.

Antioxidant 425 (in ratios of 0.25 to 2.0%) gave very good protection against oxidation, with practically no discoloration in white rubber on exposure to sunlight.

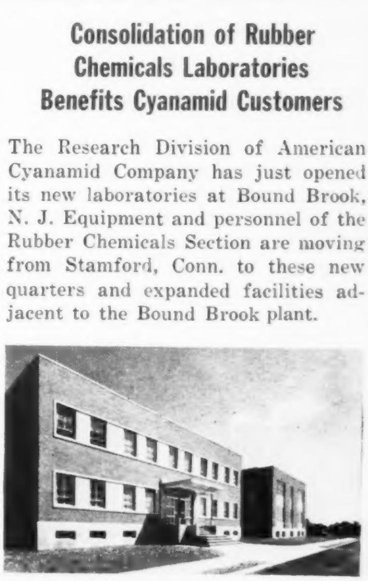
Conditions were identical for all eight antioxidants examined. The results proved that, for white or light-colored products made from dry rubber or latex, Cyanamid's Antioxidant 2246 and Antioxidant 425 offer the best combined protection against aging and discoloration.

These two great antioxidants were developed as a result of lengthy research work in Cyanamid's laboratories. However, the only real test of a product's worth is its actual field performance. In this respect, Antioxidant 2246 and Antioxidant 425 have fully proved their claims of being the finest available anywhere.

For full technical information, write for Rubber Chemicals Technical Bulletins No. 815 (Antioxidant 2246) and No. 840 (Antioxidant 425).

Consolidation of Rubber Chemicals Laboratories Benefits Cyanamid Customers

The Research Division of American Cyanamid Company has just opened its new laboratories at Bound Brook, N. J. Equipment and personnel of the Rubber Chemicals Section are moving from Stamford, Conn. to these new quarters and expanded facilities adjacent to the Bound Brook plant.



American Cyanamid Company's new research facilities at Bound Brook, New Jersey.

An important objective of this move is to bring the long experience of our Rubber Chemicals laboratory team into much closer contact with the production and technical sales staff of the Rubber Chemicals group at the Bound Brook plant and laboratories. Together, they now represent an on-the-spot source of our knowledge and service on rubber chemicals compounding and processing that will benefit Cyanamid customers in terms of integrated actions involving rubber compounding problems.

Relocation of the rubber laboratory is another step in Cyanamid's program to increase the effectiveness of its various technical and research groups by making more available the plant and sales contact relevant to their work. Major research and development work on rubber chemicals will be conducted at Bound Brook.

With this new change, the Bound Brook facilities will service Cyanamid's Organic Chemicals Division Plant. The excellent basic research facilities at Stamford will continue to be employed to the benefit of any Cyanamid department requiring them.

	Eastern Points	Akron, O.
	(¢ per Lb.)	
Auto tubes, mixed	2.75	2.75
Black	6.25	6.50
Red	6.75	7.00
Butyl	3.75	3.75

Reclaimed Rubber

Since mid-July there has been a moderate upward trend in the consumption of reclaimed rubber. The increase is expected to continue through September, and a good business is anticipated.

According to the Rubber Manufacturers Association report, July production reached 20,700 tons and exceeded that month's consumption by 300 tons. During the seven-month period ending in July, domestic production totaled 162,839 tons; while consumption amounted to 159,974 tons.

RECLAIMED RUBBER PRICES

Whole tire, first line	$0.11
Third line	.1025
Inner tube; black	.16
Red	.21
Butyl	.14
Light carcass	.22
Mechanical, light colored, medium gravity	.15
Black, medium gravity	.085

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Industrial Fabrics

Despite price reductions for many industrial fabrics, trading remained sluggish during the July 16-August 15 period. Inventories at both mill and primary-user levels have gradually drained, however, because of earlier production curtailments. Some cautious optimism has developed in regard to headlinings as a result of recent inquiries for that material from the automotive field. Nothing tangible in the way of business, however, has developed as yet.

INDUSTRIAL FABRICS

Drills	
59-inch 1.85 yd. *yd.*	$0.340
2.25-yd.	.290
Ducks	
38-inch 1.78-yd. S.F. *yd.*	nom.
2.00-yd. D.F.	.30
51.5-inch, 1.35-yd. S.F. *yd.*	....
Hose and belting	.69
Osnaburgs	
40-inch 2.11-yd. *yd.*	.235
3.65-yd.	.155
Raincoat Fabrics	
Printcloth, 38½-in., 64-60, 5.35-yd. *yd.*	.1325
6.25-yd.	.1165
Sheeting, 48-inch, 4.17-yd.	.20
52-inch, 3.85-yd.	.2275
Chafer Fabrics	
14.40-oz./sq. yd. Pl. *yd.*	.73
11.65-oz./sq. yd. S.	.61
10.80-oz./sq. yd. S.	.6575
8.9-oz./sq. yd. S.	.67

Other Fabrics	
Headlining, 59-in., 1.65-yd., 2-ply *yd.*	$0.41
64-inch, 1.25-yd., 2-ply	.59
Sateens, 58-inch, 1.32-yd.	.525
58-inch, 1.21-yd.	.57

Rayon

Packaged production of rayon and acetate filament yarn reached a total of 55,500,000 pounds, consisting of 27,000,000 pounds of high-tenacity rayon yarn and 28,500,000 pounds of regular-tenacity yarn. June production has been: total, 56,700,000; regular tenacity, 30,100,000 pounds; and high-tenacity, 26,600,000 pounds.

Filament yarn shipments to domestic consumers totaled 54,100,000 pounds, of which 25,900,000 pounds were high-tenacity rayon yarn, and 28,200,000 pounds were regular-tenacity yarn. June shipments were: total, 53,000,000 pounds; high-tenacity rayon yarn, 24,300,000 pounds; and 28,700,000 pounds of regular-tenacity yarn.

Total-end-of July stocks were 69,700,000 pounds, consisting of 13,500,000 pounds high-tenacity rayon yarn, and 56,200,000 pounds regular-tenacity yarn. End-of-June stocks has been: total, 69,400,000 pounds, of which 13,100,000 pounds were high-tenacity yarn, and 56,300,000 pounds regular-tenacity yarn.

There have been some price reductions which are included in the table below.

RAYON PRICES

Tire Yarns	
High-Tenacity	
1100/ 490, 980	$0.59/$0.64
1100/ 490	.59/ .63
1150/ 490, 980	.59/ .63
1165/ 480	.59/ .65
1230/ 490	.59/ .63
1650/ 720	.55/ .58
1650/ 980	.55/ .58
1875/ 980	.55/ .58
2200/ 960	.54/ .57
2200/ 980	.54/ .57
2200/1466	.64
4400/2934	.60
Super-High Tenacity	
1650/ 720	.58
1900/ 720	.58
Tire Fabrics	
1100/490/2	.69 / .73
1650/980/2	.725
2200/980/2	.625/.655

Financial

(*Continued from page 874*)

Shell Oil Co., New York, N. Y., and wholly owned subsidiaries. Six months to June 30, 1957: net profit, $75,320,849, equal to $2.49 a capital share, compared with $69,440,912, or $2.29 a share, in last year's half; sales, $902,588,690, against $794,985,770.

United Carbon Co., Inc., Charleston, W. Va., and subsidiaries. Initial half, 1957: net profit, $3,114,915, equal to $2.61 a capital share, against $3,018,106, or $2.53 a share, in the first six months of 1956: net sales, $29,010,880, against $31,600,211.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. June half, 1957: net earnings, $53,398,637, equal to $1.55 a share, against $51,565,719, or $1.50 a share, in the 1956 half.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. Initial half, 1957: net income, $29,239,370, equal to $2.95 a share, compared with $30,258,088, or $3.06 a share, in the similar months last year.

H. K. Porter & Co., Inc., Pittsburgh, Pa. June half, 1957: net earnings, $3,460,268, equal to $3.21 a share, against $3,991,746, or $3.72 a share, a year earlier.

Rome Cable Corp., Rome, N. Y. Quarter ended June 30, 1957: net income, $351,000, equal to 62¢ a capital share, compared with $540,000, or $1.02 a share, in the second quarter of 1956.

St. Joseph Lead Co., New York, N. Y. January 1-June 30, 1957: net income, $5,759,433, equal to $2.12 a share, against $5,076,591, or $1.86 a share in the similar months of 1956.

Scovill Mfg. Co., Waterbury, Conn. January 1-June 30, 1957: net income, $2,100,948, equal to $1.23 a share, contrasted with $3,311,647, or $2.24 a share, in the 1956 months.

Seiberling Rubber Co., Akron, O. Six months to June 30, 1957: net profit, $508,402, equal to 96¢ a common share, compared with $452,820, or 82¢ a share in last year's half; net sales,$23,289,041, against $24,018,569.

Sheller Mfg. Co., Portland, Ind. Six months ended June 30, 1957: net income, $1,152,963, equal to $1.21 a share, compared with $820,210, or 86¢ a share, in the like period last year.

Sun Oil Co., Philadelphia, Pa., and subsidiaries. First half, 1957: net earnings, $25,187,436, equal to $2.34 a common share, against $25,138,552, or $2.48 a share, a year earlier.

Thiokol Chemical Corp., Trenton, N. J. June half, 1957: net profit, $650,483, equal to $1.34 a capital share, compared with $386,516, or 85¢ a share, a year earlier; net sales, $12,987,278, against $9,759,812.

United States Rubber Co., New York, N. Y. June half, 1957: net earnings, $18,140,234, equal to $2.77 a common share, compared with $18,659,106, or $2.91 a share, in the same period last year; net sales, $451,298,696, against $464,095,454.

Wallace & Tiernan, Inc., Belleville, N. J. Initial half, 1957: net profit, $1,695,863, equal to $1.28 a share, compared with $1,422,420, or $1.07 a share, in the 1956 half; sales, $23,507,710, against $21,895,171.

Thermoid Co., Trenton, N. J. First half, 1957: net earnings, $675,815, equal to 75¢ a common share, compared with $898,943, or $1.01 a share, in last year's half; net sales, $19,621,737, against $18,716,488.

Timken Roller Bearing Co., Canton, O. June half, 1957: net income, $12,890,547, equal to $2.42 a capital share, against $12,977,150, or $2.43 a share, in the corresponding months of 1956.

Union Asbestos & Rubber Co., Chicago, Ill. Six months to June 30, 1957: net earnings, $355,276, equal to 75¢ a share, contrasted with net loss of $254,818 a year earlier.

Union Carbide Corp., New York N. Y. Six months to June 30, 1957: net income, $69,601,905, equal to $2.31 a capital share, compared with $72,789,578, or $2.42 a share, in last year's half; net sales, $690,416,175, against $640,108,456.

United Elastic Corp., Easthampton, Mass. Six months ended June 30, 1957: net income, $1,027,246, equal to $2.53 a share, against $958,394, or $2.36 a share, in last year's months.

United Engineering & Foundry Co., Pittsburgh, Pa. Six months to June 30, 1957: net profit, $2,738,051, equal to $1.10 a share, compared with $1,980,050, or 79¢ a share, a year earlier.

S. S. White Dental Mfg. Co., Philadelphia, Pa. Six months ended June 30, 1957: net income, $374,489, equal to $1.02 a share, compared with $372,234, or $1.01 a share, in the corresponding months of last year.

Liberia

The Firestone Plantations Co. in Liberia recently increased the wages of its 30,000 workers by 10%. Lately thousands of workers have been deserting mines and plantations to flock to the diamond fields in hopes of getting rich quickly. It appears that the government is taking steps to stop this trend.

Germany

The International Congress and Exhibition of Measuring Instrumentation and Automation, INTERKAMA, scheduled for Düsseldorf, November 2-10, 1957, will attempt to put the plain facts of automation and automatic control before the public. The special aims of both the Congress and the Exhibition are to encourage technical methods of regulation and control and their technical application, and to further the development and improvement of existing designs and clarify basic questions pertaining to measurement.

Synthetic Rubbers and Latices*

Monomers

Acrylonitrile	lb.	$0.27	
Butadiene	lb.	.15	
Dow Styrene N99, H99	lb.	.205	
RG	lb.	.17	
Vinyltoluene	lb.	.17	
Hylene M	lb.	3.50	/ $5.00
M-50	lb.	1.90	/ 3.40
T	lb.	1.10	/ 2.65
TM	lb.	.95	/ 2.50
-65	lb.	1.00	/ 2.55
Isobutylene	lb.	.38	
Isoprene	lb.	.25	
Monomer MG-1	lb.	1.00	/ 1.25
Mondur-C	lb.	1.05	
-S	lb.	.85	
Multron R-2	lb.	.54	
Rohm & Haas ethyl acrylate	lb.	.34	/ .36
Glacial methacrylic acid	lb.	.45	/ .47
Methyl acrylate	lb.	.37	/ .39
Methacrylate	lb.	.29	/ .31

Shortstops

DDM	lb.	.75	/ .88
Mercaptan 174	lb.	.38	/ .50
Shortstop 204	lb.	.33	/ .37
268	lb.	.52	/ .53
Tecquinol	lb.	.825	/ .845
Thiostop K	lb.	.53	
N	lb.	.41	
Vulnapol KM	lb.	.52	/ .53
NM	lb.	.38	/ .42

Acrylic Types

Hycar 4021	1.35[c]
4501	.81[c]

Fluorocarbon Types

Kel-F Elastomer	lb.	15.00	/ 16.00

Isobutylene Types

Deenax	lb.	.94[b]	/ 1.05[b]
Enjay Butyl 035, 150, 215, 217, 218, 325			.23[a]
065, 165, 265, 267			.255
268, 365			.24[a]
Hycar 2202			.65[c]
Polysar Butyl 100, 200, 300, 400			.245[c]
101			.2775[a]
301			.255[c]
Vistanex			.45[a]

Neoprene

Neoprene Type AC, CG	.55[a]
GN, GN-A, WX	.41[a]
GRT, S	.42[a]
KNR	.75[a]
W, WHV	.39[a]
WRT	.45[a]

Latices

Neoprene Latex 571, 842-A	.37[a]
572	.39[a]
60, 601-A	.40[a]
635	.41[a]
735, 736	.38[a]
950	.47[a]

Nitrile Types

Butaprene NAA	.54[a]
NF	.40[a]
NL	.50[a]
NXM	.58[a]
Chemigum N1NS	.64[b]
N3NS, N5	.58[b]
N6, N-6B, N7	.50[b]
Hycar 1001, 1041	.58[c]
1002, 1042, 1043, 1312	.50[c]
1014	.60[c]
1411	.62[c]
1432	.59[c]
1441	.64[c]
Paracril AJ	.485[c]
B, BJ, BJLT, BLT	.50[c]
C, CLT	.58[c]
CV	.59[c]
D	.65[c]
18-80	.60[c]
Polysar Krynac 800, 802, 803	.50[c]
801	.58[c]

Latices

Butaprene N-300	.46[b]
N-400, N-401	.54[b]
Chemigum 200	.49[b]
235 CHS, 236	.54[b]
245 B, 245 CHS, 246, 247	.46[b]
Hycar 1512, 1552, 1562, 1577	.46[c]
1551, 1561, 1571	.54[c]
1852	.46[c]
Nitrex 2612, 2614	.46[a]
2615	.51[a]

Polyethylene Type

Hypalon 20	lb.	.65

Polysulfide Types

Thiokol LP-2, -3, -32 -33	$0.96[a]
-8, -38	1.25[a]
PR-1	.95[a]
Type-A	.47[a]
FA	.69[a]
ST	1.00[a]

Latices

Thiokol Latex (dry wt.)	
Type MF	.85[a]
MX	.70[a]
WD-2	.92[a]
-5	.95[a]
-6, -7	.70[a]

Silicone Types

GE (compounded)	$2.25[c]	/ 4.10[c]
Silicone gum (not compounded)	3.85[b]	/ 4.90[c]
Silastic (compounded)	1.95[b]	/ 3.65[b]
(Partly compounded)	3.25[b]	/ 4.35[b]
(Uncompounded)	3.85[b]	/ 4.50[b]
Union Carbide (compounds)	2.35[b]	/ 3.20[b]
(Gums)	3.85[b]	/ 4.25[b]

Styrene Types†

Hot SBR‡

Ameripol 1000, 1001, 1006	.241[c]
1002	.2435[c]
ASRC 1000, 1001, 1004, 1006	.241[c]
1018	.270[c]
1019	.265[c]
FR-S 1000, 1001, 1004, 1006	.241[c]
1009	.2475[c]
1010	.26[c]
1012	.2425[c]
1013	.25[c]
1014	.281[c]
1015	.291[c]
Naugapol 1016, 1019	.265[b]
1018	.27[b]
1021	.30[b]
1022	.28[b]
1023	.285[b]
Philprene 1000, 1001, 1006	.241[b]
1009	.2475[b]
1010	.26[b]
1018	.27[b]
1019	.265[b]
Plioflex 1006	.241[c]
Polysar Kryflex S, S-50	.241[c]
S-X-371	.255[c]
S-1000, -1001, -1006, -1013	.23[a]
-1002, -1011	.2325[a]
Synpol 1000, 1001, 1006, 1007, 1061	.241
1002	.2435[b]
1012	.2425[b]
1009	.2475[b]
1013	.25[b]

Hot SBR Black Masterbatch

Philprene 1100	$0.194
1104	.190[b]
S-1100	.185[a]

Cold SBR

Ameripol 1500, 1501, 1502	.241[c]
ASRC 1500, 1502	.241[c]
1503	.2625[c]
Copo 1500, 1502	.241[c]
1505	.261[c]
FR-S 1500, 1502	.241[c]
Naugapol 1503	.2625[b]
1504	.295[b]
Philprene 1500, 1502	.241[b]
1503	.2625[b]
Plioflex 1500, 1502	.241[c]
Polysar Krylene	.241[c]
S-1500, -1501, -1502	.23[b]
Synpol 1500, 1502, 1551	.241[b]

Cold SBR Black Masterbatch

Baytown 1600, 1601, 1602	.176[a]
Philprene 1600, 1601	.193[b]
1605	.19[b]
S-1600, -1601, -1602	.1825[a]

Cold SBR Oil Masterbatch

Ameripol 1703	.206[c]
1705	.2035[c]
1707	.191[c]
1710, 1712	.1885[c]
ASRC 1703	.206[c]
1708	.191[c]
Copo 1712	.1885[c]
FR-S 1703	.206[c]
1705	.2035[c]
1712	.1885[c]
Philprene 1703	.206[b]
1706	.203[b]
1708	.191[b]
1712	.1885[b]
Plioflex 1703, 1773	.206[c]
1710, 1712	.1885[c]
1778	.191[c]
Polysar Kryflex 200	.241[c]
SS-250	.30[c]
Polysar Krylene NS	.241[c]
Polysar Krynol 651	.1885[c]
652	.191[c]
S-1703	.195[a]
1705, 1706	.1925[a]
-1707	.18[a]
-1709, -1712	.1775[a]
Synpol 1703	.206[b]
1707, 1708	.191[b]
1711	.19[b]

Cold SBR Oil-Black Masterbatch

Baytown 1801	.16[a]
Philprene 1803	.174[b]
S-1801	.1675[a]

Hot SBR Latices

FR-S 2000, 2001, 2006	.26[a]
2002	.285[a]
2003, 2004	.295[a]
Naugatex 2000, 2001, 2006	.263[a]
2002	.288[a]
2005	.30[a]
Pliolite Latex 2000, 2001	.2775[c]
2076	.29[c]
S-2000	.2275[a]
2006	.215[a]

Cold SBR Latices

Copo 2101, X-765	.30[c]
2102, 2105	.32[c]
FR-S 2105	.31[a]
Naugatex 2101	.285[a]
2105	.312[a]
X-767	.323[a]
Pliolite Latex 2101, X765	.30[c]
2105	.32[c]
S-2101	.225[a]
-2105	.31[a]

Cold BR Latex§

Pliolite Latex 2104	.32[c]

* Prices are per pound carload or tank-car dry weight unless otherwise specified.

[a] Freight extra.

[b] Minimum freight allowed.

[c] Freight prepaid.

† Listed below are the new SBR type synthetic rubbers and latices trade names and the chief sales offices of their producers or distributors.

Ameripol	—Goodrich-Gulf Chemicals, Inc., 3135 Euclid Ave., Cleveland 15, O.
ASRC	—American Synthetic Rubber Corp., 500 Fifth Ave., New York 36, N. Y.
Baytown	—United Rubber & Chemical Co., Baytown, Tex. (producer); United Carbon Co., Inc., Charleston 27, W. Va. (distributor).
Butaprene, FR-S	—Firestone Tire & Rubber Co., Synthetic Rubber Division, 381 Wilbeth Rd., Akron 1, O.
Copo	—Copolymer Rubber & Chemical Corp., P. O. Box 2595, Baton Rouge 1, La.
Naugapol, Naugatex	—Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.
Philprene	—Phillips Chemical Co., Rubber Chemicals Division, 318 Water St., Akron 8, O.
Plioflex	—Goodyear Tire & Rubber Co., Chemical Division, Akron 16, O.
Pliolite Latex	—Goodyear Tire & Rubber Co., Chemical Division. Also distributed by General Latex & Chemical Corp., 666 Main St., Cambridge 39, Mass.
Polysar	—Polymer Corp., Ltd., Sarnia, Ont., Canada (producer); H. Muehlstein & Co., Inc., 60 E. 42nd St., New York 17, N. Y. (distributor).
S-	—Shell Chemical Corp., Synthetic Rubber Sales Division, 50 W. 50th St., New York 20, N. Y.
Synpol	—Texas-U. S. Chemical Co., Port Neches, Tex. (producer); Naugatuck Chemical (distributor).
‡SBR	—Styrene-butadiene rubber.
§BR	—Butadiene rubber.

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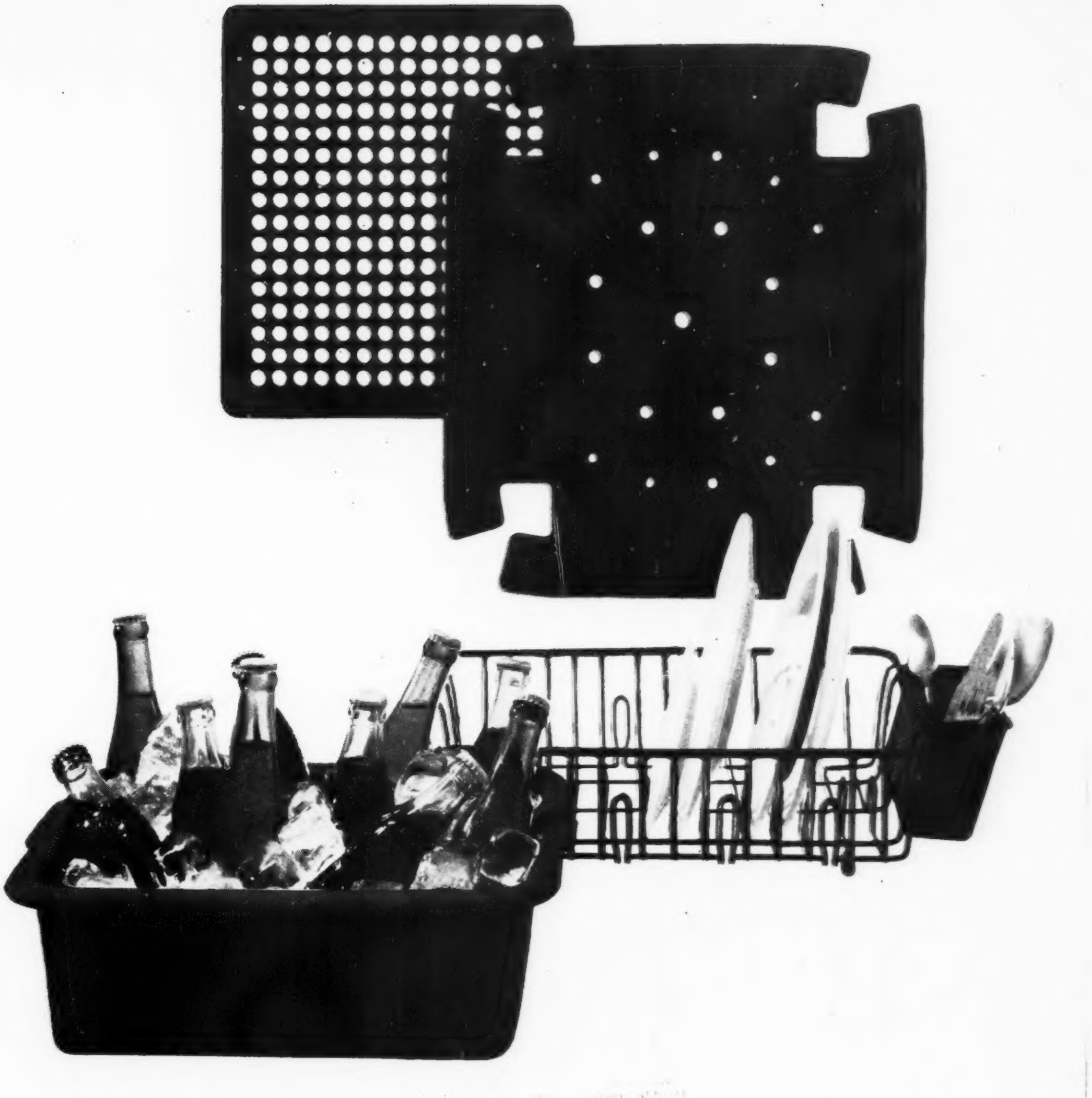
Phillips Chemical Co., Borger, Tex., is currently training nine representatives of ANIC, the Italian company which is building a synthetic rubber plant at Ravenna, Italy, using the synthetic rubber process licensed by Phillips. These representatives are being trained in operations, maintenance, and engineering in preparation for the start-up of the Italian plant late this year.



Pretty Products molds attractive Prettyware items like these in colorful turquoise, blue, green, pink, red, yellow, black, and white.

Compounding Ingredients*

Abrasives

Pumicestone, powdered	lb.	$0.0363 /	$0.065
Rottenstone, domestic	lb.	.03 /	.04
Shelblast	ton	80.00 /	165.00
Walnut Shell Grits	ton	50.00 /	160.00

Accelerators

A-1 (Thiocarbanilide)	ton	.50 /	.57
A-32	ton	.66 /	.80
A-100	lb.	.52 /	.66
Accelerator 49		.57 /	.58
52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	4.25	
89	lb.	1.20	
108	lb.	.91	
552	lb.	2.25	
808	lb.	.66 /	.68
833	lb.	1.17 /	1.19
Altax	lb.	.50 /	.52
Arazate	lb.	2.25	
Beutene	lb.	.66 /	.71
Bismate	lb.	3.00	
B-J-F	lb.	.27 /	.32
Butasan	lb.	1.04	
Butazate	lb.	1.04	
Butyl Accelerator Eight	lb.	1.10 /	1.35
Zimate	lb.	1.04	
Captax	lb.	.40 /	.42
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Dibs	lb.	.85	
Diesterex N		.50 /	.57
Dipac	lb.	.85	
DOTG (diorthotolylguanidine)			
Cyanamid	lb.	.62 /	.63
Du Pont	lb.	.62 /	.63
DPG (diphenylguanidine)			
Cyanamid	lb.	.52 /	.53
Monsanto	lb.	.52 /	.58
El-Sixty	lb.	.60 /	.67
Ethasan	lb.	1.04	
Ethazate	lb.	1.04	
50-D	lb.	.85	
Ethyl Thiurad	lb.	1.04	
Tuads	lb.	1.04	
Tuex	lb.	1.04	
Zimate	lb.	1.04	
Ethylac #650	lb.	.93 /	.95
Guantal	lb.	.60 /	.67
Hepteen	lb.	.44 /	.50
Base	lb.	1.85	
Ledate	lb.	1.04	
MBT (2-mercaptobenzothiazole)			
American Cyanamid	lb.	.42 /	.44
Du Pont	lb.	.42 /	.44
Naugatuck	lb.	.42 /	.47
-XXX, Cyanamid	lb.	.53 /	.55
MBTS (mercaptobenzothiazyl disulfide)			
Cyanamid	lb.	.52 /	.54
Du Pont	lb.	.52 /	.54
Naugatuck	lb.	.52 /	.57
-W Cyanamid	lb.	.57 /	.59
Merac #225	lb.	.75 /	1.05
Mertax	lb.	.53 /	.60
Methasan	lb.	1.04	
Methazate	lb.	1.04	
Methyl Tuads	lb.	1.14	
Zimate	lb.	1.04	
Monex	lb.	1.14	
Mono-Thiurad	lb.	1.14	
2-MT (2-mercaptothiazoline)			
Du Pont	lb.	1.00	
NOBS No. 1	lb.	.74 /	.76
Special	lb.	.79 /	.81
O-X-A-F	lb.	.53 /	.58
Pentex	lb.	1.14	
Flour	lb.	.26	
Permalux	lb.	2.17	
Phenex	lb.	.52 /	.59
Pip-Pip		2.07	
R-2 Crystals	lb.	4.35	
Rotax	lb.	.51 /	.53
RZ-50, -50B	lb.	1.00	
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Santocure	lb.	.74 /	.81
NS	lb.	.79 /	.86
Selenacs	lb.	4.25	
SPDX-GH	lb.	.69 /	.74
GL	lb.	1.20 /	1.34
Tellurac	lb.	1.21	
Tepidone	lb.	.45 /	.48
Tetrone A	lb.	1.91	
Thiofide	lb.	.52 /	.59
S	lb.	.62 /	.69
Thionex	lb.	1.14	
Thiotax	lb.	.42 /	.49
Thiurad	lb.	1.14	
Thiuram E	lb.	1.04	
M	lb.	1.14	
Trimene	lb.	.56 /	.62
Base	lb.	1.03 /	1.10
Tuex	lb.	1.14	
Ultex	lb.	1.00 /	1.10
Unads	lb.	1.14	
Ureka Base	lb.	.66 /	.73
Vulcacure NB	lb.	.45	
NS	lb.	.75 /	1.05
ZB, ZE, ZM	lb.	.85 /	.89

Z-B-X	lb.	$2.45	
Zenite	lb.	.52 /	$0.54
A	lb.	.62 /	.64
Special	lb.	.53 /	.55
Zetax	lb.	.51 /	.53
Zimate	lb.	1.04	

Accelerator-Activators, Inorganic

Lime, hydrated	ton	21.96	
Litharge, comml.	lb.	.175 /	.18
Eagle, sublimed	lb.	.18	
National Lead, sublimed	lb.	.18 /	.19
Red lead, comml.	lb.	.185 /	.195
Eagle	lb.	.19	
National Lead	lb.	.19 /	.20
White lead, carbonate	lb.	.19 /	.20
Eagle	lb.	.19 /	.20
National Lead	lb.	.18 /	.19
Silicate	lb.	.1725 /	.1825
Eagle	lb.	.20 /	.2175
National Lead	lb.	.1625 /	.1725
Zinc oxide, comml.†	lb.	.145 /	.1925

Accelerator-Activators, Organic

Aktone	lb.	.2125 /	.2325
Barak	lb.	.62	
Capital 170	lb.	.215 /	.255
171	lb.	.1375 /	.1775
700, 701	lb.	.1575 /	.1975
705, 710	lb.	.1575 /	.1975
800	lb.	.1125 /	.1325
801	lb.	.1475 /	.1675
802	lb.	.1525 /	.1725
803	lb.	.175 /	.195
Curade	lb.	.57 /	.59
D-B-A	lb.	1.95	
Emery 600	lb.	.1425 /	.1925
Groco 30	lb.	.1425 /	.1925
35	lb.	.1475 /	.1975
Guantal	lb.	.57 /	.64
Hyfac 400	lb.	.1062 /	.1375
430	lb.	.1612 /	.1925
431	lb.	.1837 /	.215
Hystrene S-97	lb.	.1863 /	.2125
T 45	lb.	.1638 /	.19
T-70	lb.	.1738 /	.20
Industrene B	lb.	.1263 /	.1525
R	lb.	.1138 /	.14
158	lb.	.1313 /	.1575
254	lb.	.1413 /	.1675
262	lb.	.1513 /	.1775
Laurex	lb.	.33 /	.37
MODX	lb.	.295 /	.345
NA-22	lb.	1.00	
Oleic acid, comml.	lb.	.185 /	.225
Emersol 210 Elaine	lb.	.17 /	.22
Groco 2, 4, 8, 18	lb.	.17 /	.22
Plastone	lb.	.27 /	.30
Polyac	lb.	1.85	
Ridacto	lb.	.25 /	.26
Seedine	lb.	.1485 /	.1703
Stearex Beads	lb.	.1488 /	.1588
Stearic acid			
Emersol 120	lb.	.19	
150	lb.	.2225	
Hydrofoil 51	lb.	.09	
Hydrogenated, rubber grd.			
Groco	lb.	.1275 /	.1525
Rufat 75	lb.	.1062 /	.1325
Single pressed, comml.	lb.	.1475 /	.1675
Emersol 110	lb.	.1533 /	.185
Groco 53	lb.	.16 /	.185
Wilmar 253	lb.	.1525 /	.1775
Double pressed, comml.	lb.	.1525 /	.1725
Groco 54	lb.	.165 /	.19
Wilmar 254	lb.	.1575 /	.1825
Triple pressed, comml.	lb.	.175 /	.195
Groco 55	lb.	.1875 /	.2125
Wilmar 255	lb.	.1875 /	.2125
Sterene 60-R	lb.	.09 /	.1075
Tonox	lb.	.515 /	.605
Vimbra	lb.	.32 /	.385
Vulklor	lb.	.88 /	1.08
Wilmar 110	lb.	.17 /	.22
434	lb.	.1425 /	.1925
Zinc stearate, comml.	lb.	.39 /	.44

Antioxidants

AgeRite Alba	lb.	2.35 /	2.45
Gel	lb.	.64 /	.66
H. P.	lb.	.72 /	.74
Hipar	lb.	.98 /	1.00
Powder	lb.	.52 /	.54
Resin	lb.	.75 /	.77
D	lb.	.52 /	.54
Spar	lb.	.52 /	.54
Stalite	lb.	.52 /	.54
S	lb.	.52 /	.54
White	lb.	1.45 /	1.55
Akroflex C	lb.	.81 /	.83
CD	lb.	.76 /	.78

* Prices, in general, are f.o.b. works. Range indicates grade or quantity variations. No guarantee of these prices is made. Spot prices should be obtained from individual suppliers.

† For trade names, see Color—White, Zinc Oxides.

‡ At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

Albasan	lb.	$0.69 /	$0.71
Allied AA-1144	lb.	.23 /	.24
AA-1177	lb.	.155 /	.165
Aminox	lb.	.55 /	.60
Antioxidant 425	lb.	2.47 /	2.50
2246	lb.	1.50 /	1.53
Antis	lb.	.23 /	.24
Antisun	lb.	.15 /	.51
Antox	lb.	.55 /	.57
Aranox	lb.	3.25 /	.54
Betanox Special	lb.	.85 /	.90
B-L-E .25	lb.	.55 /	.60
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.55 /	.60
Catalin AC-5	lb.	1.49 /	1.63
Copper Inhibiter X-872-L	lb.	2.01	
D-B-P-C	lb.	.91 /	1.16
Flectol H		.55 /	.62
Flexamine	lb.	.76 /	.81
Heliozone	lb.	.31 /	.32
Ionol	lb.	.91 /	1.65
Microflake	lb.	.20 /	.24
NBC	lb.	1.55	
Neozone A	lb.	.59 /	.61
C	lb.	.83	
D	lb.	.55 /	.57
Nevastain A	lb.	.51 /	.61
B	lb.	.51 /	.70
Octamine	lb.	.55 /	.60
PDA-10	lb.	.46 /	.48
Perflectol	lb.	.61 /	.68
Permalux	lb.	2.17 /	
Polygard	lb.	.55 /	.60
Polylite	lb.	.55 /	.60
Protector	lb.	.26 /	.31
Rio Resin	lb.	.60 /	.62
Santoflex 35	lb.	.72 /	.79
75	lb.	.97 /	1.04
AW	lb.	.78 /	.85
B	lb.	.52 /	.59
BX	lb.	.63 /	.70
DD	lb.	.55 /	.62
Santovar A	lb.	1.50 /	1.57
Santowhite Crystals, Powder	lb.	1.55 /	1.62
L	lb.	.55 /	.62
MK	lb.	1.25 /	1.32
Stabilite	lb.	.55 /	.59
Alba	lb.	.72 /	.79
L	lb.	.60 /	.64
White	lb.	.52 /	.60
Powder	lb.	.41 /	.47
Styphen I	lb.	.51 /	.55
Sunolite #100	lb.	.21 /	.23
#127	lb.	.17 /	.19
Sunproof-713	lb.	.25 /	.30
Improved	lb.	.25 /	.30
Jr.	lb.	.20 /	.25
Tenamene 3	lb.	.91 /	1.05
Thermoflex	lb.	1.00 /	1.02
Tonox	lb.	.52 /	.57
Tysonite	lb.	.24 /	.2475
Velvapex 51-250	lb.	.40 /	
V-G-B	lb.	.75 /	.80
Wing-Stay S	lb.	.53 /	.65
Zenite	lb.	.52 /	.54

Antiozonants

Tenamene 30, 31	lb.	1.24 /	1.28
UOP 88, 288	lb.	1.25 /	1.29

Antiseptics

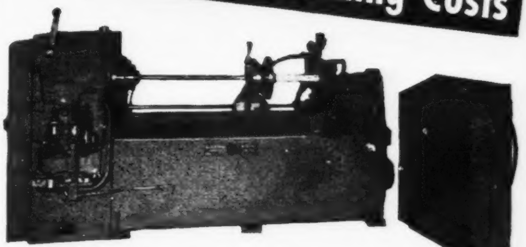
Copper naphthenate, 6-8%	lb.	.245	
Pentachlorophenol	lb.	.22 /	.30
Resorcinol, technical	lb.	.775 /	.785
Zinc naphthenate, 8-10%	lb.	.245 /	.30

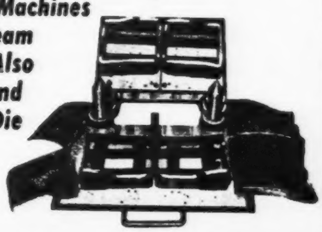
Blowing Agents

Ammonium bicarbonate	lb.	.07 /	.09
Carbonate	lb.	.16	
Blowing Agent CP 1475	lb.	.32 /	.35
Celogen	lb.	1.95	
50 C	lb.	1.01 /	1.07
Opex 40	lb.	.75 /	.76
Sodium bicarbonate	100 lbs.	2.55 /	3.85
Carbonate, tech.	100 lbs.	1.35 /	5.52
Sponge Paste	lb.	.20	
Unicel ND	lb.	.76	
NDX	lb.	1.52	
S	lb.	.20	

Bonding Agents

Braze	gal.	6.00 /	9.00
Cover cement	gal.	2.50 /	4.00
Chemlok 201, 203	gal.	5.00 /	7.50
220	gal.	9.25 /	12.00
401	gal.	11.70 /	14.40
602	gal.	25.00 /	26.00
607	gal.	18.00 /	
614	lb.	4.35 /	4.75
Flocking Adhesive RFA17, RFA22, RFA25	lb.	.50	
G-E Silicone Paste SS-15	lb.	4.52 /	5.10
SS-64	lb.	3.65 /	6.75
-67 Primer	lb.	7.50 /	12.50
Gen-Tac Latex	lb.	.70 /	.805
Hylene M	gal.	3.50 /	3.75
M-50	gal.	1.90 /	2.15
Kalabond Adhesive	gal.	6.50 /	16.00
Tie Cement	gal.	2.00 /	5.60
Thixons	gal.	1.48 /	12.00
Ty Ply, BN, Q, S, UP, 3640	gal.	6.75 /	8.00
RC	gal.	3.75 /	5.00





Brake Lining Saturants

BRT 3	lb.	$0.018 /	$0.0265
Resinex L-S	lb.	.0225/	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-40	lb.	.23 /	.30
Kosmos/Dixie BB	lb.	.23 /	.30
Spheron C	lb.	.15 /	.195
Voltex	lb.	.18 /	.315

Easy Processing Channel—EPC

Collocarb EPC	lb.	.059 /	.099
Continental AA	lb.	.074 /	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074 /	.1225
Micronex W-6	lb.	.0775/	.145
Spheron #9	lb.	.0725/	.1225
Texas E	lb.	.074 /	.1225
Witco #12	lb.	.074 /	.1225
Wyex EPC	lb.	.0775/	.135

Hard Processing Channel—HPC

Continental F	lb.	.074 /	.1225
HX HPC	lb.	.074 /	.1225
Kosmobile S/Dixiedensed S	lb.	.074 /	.1225
Micronex Mk. II	lb.	.0775/	.145
Witco #6	lb.	.074 /	.1225

Medium Processing Channel—MPC

Arrow MPC	lb.	.0775/	.135
Continental A	lb.	.074 /	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.0775/	.145
Micronex Standard	lb.	.0725/	.145
Spheron #6	lb.	.0725/	.1225
Texas 109	lb.	.079 /	.1275
M	lb.	.074 /	.1225
Witco #1	lb.	.074 /	.1225

Conductive Furnace—CF

Aromex CF	lb.	.0875/	.145
Vulcan C	lb.	.105 /	.15
SC	lb.	.18 /	.223

Fast Extruding Furnace—FEF

Arovel FEF	lb.	.0675/	.125
Continex FEF	lb.	.06 /	.10
Kosmos 50/Dixie 50	lb.	.06 /	.10
Philblack A	lb.	.0675	.115
Statex M	lb.	.0675/	.125
Sterling SO	lb.	.0625/	.10

Fine Furnace—FF

Statex B	lb.	.0725/	.13
Sterling 99	lb.	.0675/	.105

High Abrasion Furnace—HAF

Aromex HAF	lb.	.0775/	.135
Continex HAF	lb.	.079 /	.125
Kosmos 60/Dixie 60	lb.	.079 /	.1175
Philblack O	lb.	.0775/	.125
Statex R	lb.	.0775/	.135
Vulcan #3	lb.	.0725/	.114

Intermediate Super Abrasion Furnace—ISAF

Aromex ISAF	lb.	.0925/	.15
Kosmos 70/Dixie 70	lb.	.10 /	.145
Philblack I	lb.	.0925/	.14
Statex 125	lb.	.0925/	.15
Vulcan 6	lb.	.0875/	.13

Super Abrasion Furnace—SAF

Philblack E	lb.	.115 /	.1625
Vulcan 9	lb.	.115 /	.165

General Purpose Furnace—GPF

Arogen GPF	lb.	.06 /	.1175
Sterling V	lb.	.055 /	.09
V Non-staining	lb.	.05 /	.09

High Modulus Furnace—HMF

Collocarb HMF	lb.	.045 /	.085
Continex HMF	lb.	.055 /	.095
Kosmos 40/Dixie 40	lb.	.055 /	.095
Modulex HMF	lb.	.0625/	.12
Statex 93	lb.	.0625/	.12
930	lb.	.047 /	.087
Sterling L, LL	lb.	.0575/	.095

Semi-Reinforcing Furnace—SRF

Collocarb SRF	lb.	.042 /	.082
Continex SRF	lb.	.045 /	.085
Essex SRF	lb.	.0575/	.115
Furnex	lb.	.0575/	.115
Gastex	lb.	.0575/	.0925
Kosmos 20/Dixie 20	lb.	.045 /	.085
Pelletex, NS	lb.	.0525/	.0875
Sterling NS, S	lb.	.0475/	.0875
R	lb.	.0575/	.0925

Fine Thermal—FT

P-33	lb.	.0575	
Sterling FT	lb.	.0575	

Medium Thermal—MT

Sterling MT	lb.	$0.04	
Non-staining	lb.	.05	
Thermax	lb.	.04	
Stainless	lb.	.05	

Colors

Black

Iron oxides, comml.	lb.	.1235/	$0.135
BK—Lansco	lb.	.1275/	.13
Williams	lb.	.145	
Lansco synthetic	lb.	.10	
Mapico	lb.	.1475/	.15
Lampblack, comml.	lb.	.16 /	.45
Superjet	lb.	.085 /	.12
Permanent Blue	lb.	.80 /	1.05
Stan-Tone	lb.	.45 /	1.20
Vansul masterbatch	lb.	.60 /	.65
Paste	lb.	.14 /	.15

Blue

Alkali Blue	lb.	1.12 /	2.10
Cyanamid ultramarine	lb.	.29	
Du Pont	lb.	1.77 /	4.55
Filo	lb.	.28	
Heveatex pastes	lb.	.80 /	1.45
Lansco ultramarines	lb.	.25 /	.28
Monsanto Blue 7	lb.	1.55	
11	lb.	3.45	
DPB-283	lb.	1.93	
S-11	lb.	2.05	
Permanent Blue	lb.	.80 /	1.05
Stan-Tone Violet Blue D-4900	lb.	1.97 /	2.15
Vansul masterbatch	lb.	.90 /	2.70

Brown

Filo	lb.	.13	
Iron oxides, comml.	lb.	.1425/	.145
Lansco synthetic	lb.	.125	
Mapico Brown	lb.	.1575/	.16
Sienna, burnt, comml.	lb.	.0425/	.155
Williams	lb.	.115 /	.1775
Raw, comml.	lb.	.045 /	.1325
Williams	lb.	.08 /	.1725
Umber, burnt, comml.	lb.	.06 /	.07
Williams	lb.	.0725/	.085
Raw, comml.	lb.	.0625/	.07
Williams	lb.	.07 /	.0825
Williams, pure brown	lb.	.155	
Vandyke	lb.	.12	
Mapico Tan	lb.	.2325/	.235
Metallic Brown	lb.	.05 /	.06
Vansul masterbatch	lb.	2.10 /	2.20

Green

Chrome	lb.	.19 /	.50
Green	lb.	.80 /	2.40
Oxide	lb.	.3925/	1.10
Cyanamid	lb.	1.10	
G-4099, -6099	lb.	.4525	
GH-9869	lb.	1.10 /	1.25
9976	lb.	1.20 /	1.35
Du Pont	lb.	1.97 /	2.80
Filo	lb.	.40	
Heveatex pastes	lb.	.95 /	1.85
Lansco Toner	lb.	1.35	
Monsanto Green 3	lb.	2.75	
14	lb.	1.45	
17	lb.	3.95	
71205	lb.	1.35	
DGP	lb.	2.03	
S-17	lb.	2.25	
Stan-Tone	lb.	1.75 /	4.60
Vansul masterbatch	lb.	2.00 /	2.60

Orange

Cyanamid Permatons	lb.	1.35	
Du Pont	lb.	2.75	
Monsanto Orange 68187	lb.	2.90	
Stan-Tone			
Light orange D-7003	lb.	4.06 /	4.26
70 PCO3	lb.	2.50 /	2.92
Orange 70 PCO4	lb.	2.90 /	3.32
D-7004	lb.	4.48 /	4.68
D-7104	lb.	2.10 /	2.30
Vansul masterbatch	lb.	2.00 /	2.60

Red

Antimony trisulfide	lb.	.285 /	.315
R. M. P. No. 3	lb.	.72	
Sulfur Free	lb.	.78	
Brilliant Toning Red	lb.	1.95	
Cadmium red lithopones	lb.	2.21 /	3.77
Cadmolith	lb.	1.72 /	2.20
Cyanamid	lb.	.80 /	1.60
Du Pont	lb.	1.47 /	1.90
Filo	lb.	.11	
Indian Red	lb.	.1275	
Iron oxide, comml.	lb.	.06 /	.13
Lansco synthetic	lb.	.1175	
Mapico	lb.	.1425/	.145
Recco	lb.	.12	
Williams Red	lb.	.13 /	.1525
Monsanto Maroon 113	lb.	1.50	
61148	lb.	1.75	
Red 7	lb.	1.55	
41	lb.	4.40	
3501	lb.	1.15	
4004	lb.	1.50	
69191	lb.	3.38	
Autumn	lb.	1.10	
PRP-285	lb.	1.27	
S-44	lb.	1.28	
Rub-Er-Red	lb.	$0.0975	
Stan-Tone			
Light Red D-7005	lb.	5.23 /	$5.43
D-7105	lb.	2.26 /	2.46
70 PCO5	lb.	3.23 /	3.65
Red D-7006	lb.	5.52 /	5.72
D-7106	lb.	2.59 /	2.79
70 PCO6	lb.	3.63 /	4.05
Vansul masterbatch	lb.	.95 /	3.30
Venetian	lb.	.04 /	.0675

White

Antimony oxide	lb.	.27 /	.285
Burgess Iceberg	ton	50.00 /	80.00
Cryptone BT	lb.	.10 /	.11
Permolith lithopone	lb.	.08 /	.0875
Titanium pigments			
Horse Head Anatase	lb.	.255 /	.27
Rutile	lb.	.275 /	.29
Rayox LW	lb.	.195 /	.205
R-110	lb.	.215 /	.225
Ti-Cal	lb.	.075 /	.0825
Ti-Pure	lb.	.195 /	.225
Titanox A, AA, A-168	lb.	.21 /	.22
C-50	lb.	.1225/	.1275
RA, -10, -50	lb.	.23 /	.24
RC	lb.	.0825/	.0875
-HT, -HTX	lb.	.08 /	.085
Unitane	lb.	.255 /	.285
Zopaque Anatase	lb.	.245 /	.27
Rutile	lb.	.205 /	.29
Zinc oxide, comml.	lb.	.145 /	.1825
Azo ZZZ-11, -44, -55	lb.	.145 /	.165
20% leaded	lb.	.1505/	.1705
35% leaded	lb.	.155 /	.175
50% leaded	lb.	.1588/	.1788
Eagle AAA, lead free	lb.	.145 /	.155
5% leaded	lb.	.145 /	.155
35% leaded	lb.	.155 /	.165
50% leaded	lb.	.159 /	.169
Florence Green Seal	lb.	.1625/	.1725
Red Seal	lb.	.1575/	.1675
White Seal	lb.	.1675/	.1775
Horsehead XX-4, -78	lb.	.145 /	.155
Kadox-15, -17, -72, -515	lb.	.145 /	.155
-25	lb.	.1675/	.1775
Lehigh, 35% leaded	lb.	.155 /	.175
50% leaded	lb.	.1588/	.1788
Protox-166, -167	lb.	.145 /	.165
St. Joe, lead free	lb.	.122 /	.152
Zinc sulfide, comml.	lb.	.253 /	.263
Cryptone ZS	lb.	.253 /	.273

Yellow

Cadmium yellow lithopones	lb.	1.12 /	1.15
Cadmolith	lb.	1.12 /	1.20
Cyanamid Hansa Yellow	lb.	2.10	
Du Pont	lb.	1.80 /	2.25
Filo	lb.	.10	
Iron oxide, comml.	lb.	.0525/	.1175
Lansco synthetic	lb.	.1075	
Mapico	lb.	.12 /	.1275
Williams	lb.	.115 /	.1225
Monsanto Yellow 14	lb.	1.91	
10010	lb.	1.91	
BYP-282	lb.	1.21	
GA	lb.	2.45	
S-10010	lb.	1.17	
Stan-Tone			
Lemon 70 PCO1	lb.	1.77 /	2.19
D-7001	lb.	2.80 /	3.00
Medium yellow 70 PCO2	lb.	1.79 /	2.21
D-7002	lb.	2.98 /	3.18
Vansul masterbatch	lb.	.95 /	1.95
Williams Ocher	lb.	.0575/	.06

Dusting Agents

Diatomaceous silica	ton	32.00 /	48.00
Extrud-o-Lube, conc.	gal.	1.33 /	1.69
Glycerized Liquid Lubricant, concentrated	gal.	1.25 /	1.63
Latex-Lube GR	lb.	.20	
Pigmented	lb.	.1825	
R-66	lb.	.165	
Liqui-Lube	lb.	.1625	
N. T.	lb.	.1675	
Liquizinc No. 305	lb.	.30 /	.35
Lubrex	lb.	.25 /	.30
Mica Concord	lb.	.075 /	.0825
Mineralite	ton	45.00	
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Talc, comml.	ton	18.40 /	38.50
EM	ton	11.00 /	63.00
LS Silver	ton	29.25	
Nytals	ton	25.00 /	36.00
Sierra Sagger 7	ton	34.00	
White IR	ton	19.75	
III	ton	20.75	
Vanfre	gal.	2.00	

Extenders

BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
Cumar Resins	lb.	.065 /	.17
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29 /	.36
Brown	lb.	.1425/	.263
Neophax	lb.	.157 /	.268
White	lb.	.144 /	.285
G. B. Asphaltenes	lb.	.097 /	.177
Millex, W	lb.	.07	
Mineral Rubbers			
Black Diamond	ton	38.00 /	40.00
Hard Hydrocarbon	ton	46.50 /	48.50
Hydrocarbon MR	ton	45.00 /	55.00
Parmr	ton	21.00 /	29.00
T-MR Granulated	ton	47.50 /	50.00

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WANTED:

CHEMIST OR CHEMICAL ENGINEER

with rubber experience for western New York location. Opportunity to do laboratory and process development work. Forward details on age, experience, and salary requirements in first letter. Résumé will be held in strict confidence.

ADDRESS BOX NO. 2099
c/o RUBBER WORLD

PLANT MANAGER
For small, but modern precision molded goods operation.—Prefer man with both technical and general production background.—Preferably with O-Ring, Diaphragm, and Rubber-to-Metal experience.—Very substantial opportunity for well-qualified individual. Address Box No. 2089, care of RUBBER WORLD.

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Real Opportunities
1. Rubber and Plastics Chemists and Chemical Engineers, Research and Development.
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New opportunities for your future in the New South. Write or call today
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Polymer Chemist for application research in peroxide catalysts. Write full details to Mr. Minich, NUODEX PRODUCTS COMPANY, Elizabeth, N. J.

BELT ENGINEER
Excellent opportunity for right man having well-balanced knowledge of conveyor & transmission belt design, development, manufacturing technique, and compounding. Prefer college degree in engineering & previous experience in belt product design. Address Box No. 2094, care of RUBBER WORLD.

DEVELOPMENT COMPOUNDER
Require experienced man with knowledge of compounding for hose, belting, miscellaneous mechanical goods, for development compounding including cost reduction and quality control. Prefer college degree. Address Box No. 2095, care of RUBBER WORLD.

PRODUCT ENGINEER
Ambitious man required to start in junior capacity & train for assignments covering various phases of hose, belting, or miscellaneous mechanical rubber goods. College training technical course preferred. Address Box No. 2096, care of RUBBER WORLD.

WANTED: RECENT GRADUATE TEXTILE ENGINEER FOR PRODUCTION Control and Development work in rubber tire, belting, and hose manufacturing organization located in Eastern Pennsylvania. No experience in rubber industry required. Company offers liberal employe benefits in addition to excellent starting salary. Position leads to responsibilities through channels of advancement. Excellent opportunity for success in the expanding rubber industry. Address Box No. 2097, care of RUBBER WORLD.

RUBBER + PLASTICS
RUBBER CHEMIST
Rubber Chemist, or Compounder, with minimum of 2 or 3 years in soles and heels. Experience in closely allied fields considered. Details on request: Dr. Stuart B. Row, Vice President, O'SULLIVAN RUBBER CORPORATION, Box 603, Winchester, Virginia.

SALES REPRESENTATIVE
with technical degree, wanted by chemical manufacturer to introduce and sell organic catalysts in the polymer field. Write full details to Box No. 2100, care of RUBBER WORLD.

SITUATIONS OPEN (Continued)

RUBBER CHEMIST CONSULTANT
Boston firm engaged in manufacture of specialty chemicals for rubber industry seeks additional items to manufacture for the rubber industry. We are looking for a rubber chemist to function in the capacity of an associate consultant. Must be familiar with chemical needs of the rubber industry and be able to suggest and guide in the development and testing of suggested products. Our staff knows of this ad. Address Box No. 2092, care of RUBBER WORLD.

RUBBER CHEMIST WANTED: EXCELLENT OPPORTUNITY FOR young man with degree in Chemistry or Chemical Engineering to work on compounding and processing of molded and extruded mechanicals. Send complete resumé including salary requirements to:
W. H. SALISBURY & CO.
401 N. Morgan Street
Chicago 22, Illinois

SITUATIONS WANTED

PLANT ENGINEER, 33, MARRIED, 4 CHILDREN, 2½ YEARS college engineering, 7 years' experience rubber maintenance, equipment layout, development, dies and molds, production methods. 3 years General Manager machine shop. Address Box 2090, care of RUBBER WORLD.

PRESENTLY EMPLOYED EXECUTIVE, EXPERIENCED IN ALL technical and manufacturing phases of rubber and plastics, wants new position as Plant Manager. Accustomed to management and compounding problems. Conscientious and energetic. Address replies to Box No. 2091, care of RUBBER WORLD.

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FOR SALE: 68" X 24" 3-ROLL CALENDER; 40" X 16" MILL; 50" x 16" Mill; 80" x 20" Mill; Scott inclined plane tensile tester. COOKE COLOR & CHEMICAL CO., Hackettstown, N. J. GArden 5-3946.

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Nuba No. 1, 2	*lb.*	$0.0575/	$0.0625
3X	*lb.*	.0775/	.0825
OPD-101	*lb.*	.26	
Rubber substitute, brown	*lb.*	.16 /	.2572
Car-Bel-Ex A	*lb.*	.14	
Car-Bel-Lite	*lb.*	.35	
Extender 600	*lb.*	.1765	
White	*lb.*	.192 /	.2103
Stan-Shells	*ton*	35.00 /	73.00
Sublac Resin PX-5	*lb.*	.215 /	.235
Sundex 53	*gal.*	.12	
85	*gal.*	.1725	
Synthetic 100	*lb.*	.41	
Vistanex	*lb.*	.35 /	.475

Fillers, Inert

Agrashell flour	*ton*	50.00 /	74.00
Albacar	*ton*	55.00 /	75.00
Barytes, floated, white	*ton*	49.00 /	70.85
Off-color, domestic	*ton*	25.00	
No. 1	*ton*	55.00 /	77.50
2	*ton*	50.00 /	72.50
Sparmite	*ton*	95.00 /	117.00
Blanc fixe	*ton*	100.00 /	165.00
Burgess Iceberg	*ton*	50.00 /	80.00
Pigment #20	*ton*	35.00 /	60.00
#30	*ton*	37.00 /	60.00
HC-75	*ton*	12.00 /	30.00
-80	*ton*	14.00 /	32.00
WP #1	*ton*	11.00 /	16.00
Cary #200	*ton*	30.00 /	55.00
Citrus seed meal	*lb.*	.04	
Oil	*lb.*	.15	
Clays			
A. F. D. Filler	*ton*	26.50 /	100.00
Aiken	*ton*	14.00	
Albacar	*ton*	50.00 /	55.00
Aluminum Flake	*ton*	22.25 /	60.00
#5	*ton*	24.50 /	30.00
Champion	*ton*	14.50	
Crown	*ton*	14.00 /	33.00
Dixie	*ton*	14.00	
Franklin	*ton*	13.50 /	35.25
GK Soft Clay	*ton*	11.00	
Harwick	*ton*	15.50 /	55.50
Hi-White R	*ton*	13.50	
Hydratex R	*ton*	28.00	
Kaolloid	*ton*	10.50	
Natka 1200	*ton*	13.00	
Paragon	*ton*	13.50 /	31.50
McNamee	*ton*	13.50	
RX-43	*ton*	33.00	
Recco	*ton*	14.00	
Sno-Brite	*ton*	12.50	
Stan-Clay	*ton*	28.00	
Stellar-R	*ton*	50.00	
Suprex	*ton*	14.00 /	32.00
Swanee	*ton*	12.50	
Windsor	*ton*	14.00 /	30.00
DC Silica	*lb.*	1.45 /	1.65
Diatomaceous silica	*ton*	32.00 /	48.00
Flocks			
Cotton, dark	*lb.*	.095 /	.135
Dyed	*lb.*	.55 /	.60
White	*lb.*	.13 /	.33
Fabrifil X-24-G	*lb.*	.135	
X-24-W	*lb.*	.235	
Filfloc 6000	*lb.*	.33	
F-40-900	*lb.*	.135	
HSC #35 Silicone Emulsion	*lb.*	1.22 /	2.46
Kalite	*ton*	50.00 /	65.00
Lithopone, comml.	*lb.*	.075 /	.085
Astrolith	*lb.*	.068 /	.0675
Eagle	*lb.*	.0725/	.075
Permolith	*lb.*	.08 /	.0875
Sunolith	*lb.*	.075 /	.0825
Mica Concord	*lb.*	.075 /	.0825
Millical	*ton*	38.00 /	53.00
Mineralite	*ton*	40.00 /	60.00
Non-Fer-Al	*ton*	32.50 /	47.50
Purecal	*ton*	56.75 /	71.75
Pyrax A	*ton*	13.50	
W. A.	*ton*	16.00	
Sawdust	*ton*	14.00 /	35.00
Silversheen Mica	*lb.*	.08 /	.09
StanWhite	*ton*	10.50 /	13.10
Super-White Silica	*ton*	25.00 /	46.50
Surfex	*ton*	37.50 /	52.50
MM	*ton*	39.50 /	54.50
Suspenso	*ton*	35.50 /	50.50
Ti-Cal	*lb.*	.0675	
Valron Estersil	*lb.*	2.00 /	2.25
Walnut shell flours	*ton*	50.00 /	84.00
Whiting, limestone			
Atomite	*ton*	30.00	
Calcite	*ton*	23.00	
Calwhite	*ton*	20.00	
-T	*ton*	23.00	
Gamaco	*ton*	32.50	
Keystone	*ton*	16.00	
Laminar	*ton*	30.00	
No. 10 White	*ton*	11.00	
Omya	*ton*	30.00	
Paxinosa	*ton*	11.00 /	19.00
Snowflake	*ton*	17.00 /	18.00
Stonelite	*ton*	9.00	
Witco	*ton*	8.50	
York	*ton*	9.50	

Finishes

Apex Bright Finish #5200-E	*lb.*	.25	
Rubber Finish	*gal.*	2.50	
Black-out	*gal.*	4.50 /	8.00
Flocks, Rayon, colored	*lb.*	.90 /	1.50
White	*lb.*	.75 /	1.25

Also see Flocks, under Fillers, Inert

Paraflint RG and RGU Synthetic Wax	*lb.*	$0.15 /	$0.22
Rubber lacquer, clear	*gal.*	1.00 /	2.00
Shellacs, Angelo	*lb.*	.485 /	.7325
Vac Dry	*lb.*	.485 /	.57
Talc (*See Talc, under Dusting Agents*)			
Unidip	*lb.*	.15 /	.20
Wax, Bees	*lb.*	.68 /	.83
Carnauba	*lb.*	.57 /	1.13
Monten	*lb.*	.27	
No. 118, colors	*gal.*	.86 /	1.41
Neutral	*gal.*	.76 /	1.31
Van Wax	*gal.*	1.45 /	1.50

Latex Compounding Ingredients

Acintol D, DLR	*lb.*	.06 /	.075
FA #1	*lb.*	.065 /	.08
#2	*lb.*	.075 /	.09
Accelerator 552	*lb.*	2.25	
J-117, -302	*lb.*	1.00 /	1.15
-144	*lb.*	.15 /	.30
-307	*lb.*	1.10 /	1.25
-311	*lb.*	.60 /	.75
Aerosol, dry types	*lb.*	.39 /	1.20
Liquid types	*lb.*	.40 /	.72
Alcogum AA-16, MA-16	*lb.*	.20 /	.24
AK-12, PA-10	*lb.*	.12 /	.14
AN-6	*lb.*	.05 /	.075
-10	*lb.*	.085 /	.10
Alrosol	*lb.*	.41	
Amberex solutions	*lb.*	.1675/	.18
Antifoam J-114	*lb.*	3.25 /	3.45
P-242	*lb.*	.24 /	.35
Antioxidant J-137, -140	*lb.*	.55 /	.70
-139, -293	*lb.*	1.45 /	1.60
-182	*lb.*	2.00 /	2.15
-186	*lb.*	1.40 /	1.55
2246	*lb.*	1.50 /	1.53
Anti Webbing Agent J-183	*lb.*	.75 /	.90
-297	*lb.*	.27 /	.40
Aquablak B	*lb.*	.0975/	.1025
G	*lb.*	.12 /	.125
K	*lb.*	.12 /	.125
M	*lb.*	.105 /	.11
Aquarex D	*lb.*	.78	
G	*lb.*	.21	
L	*lb.*	.94	
MDL	*lb.*	.33	
ME	*lb.*	.80	
Aquarex NS	*lb.*	.60	
SMO	*lb.*	.50	
WAQ	*lb.*	.22	
Areskap 50	*lb.*	.30 /	.38
100, dry	*lb.*	.60 /	.72
Aresket 240	*lb.*	.30 /	.38
300, dry	*lb.*	.60 /	.72
Aresklene 375	*lb.*	.42 /	.57
Ben-A-Gels	*lb.*	.98 /	1.40
Bentone 18, 18C	*lb.*	.45	
34	*lb.*	.60	
Casein	*lb.*	.22	
Cellosize WP-09, -3, -40			
-300	*lb.*	1.00 /	1.17
CW-12		.85	
-37	*lb.*	.70	
DC Antifoam A Compound	*lb.*	5.45 /	6.65
B	*lb.*	.68 /	1.20
Emulsion	*lb.*	2.05 /	4.00
AF Emulsion	*lb.*	2.05 /	2.85
Compound 7	*lb.*	5.13 /	6.50
Defoama W-1701	*lb.*	.125	
Defoamer 115a	*lb.*	.50	
Dispersing Agents			
Blancol	*lb.*	.1525/	.26
N	*lb.*	.155 /	.26
Darvan Nos. 1, 2, 3	*lb.*	.22 /	.30
Daxad 11, 21, 23, 27	*lb.*	.08 /	.30
Dispersaid H7A	*lb.*	.58	
1159	*lb.*	.43	
Emulphor ON-870	*lb.*	.50 /	.70
Igepal CO-630	*lb.*	.2875/	.47
Igepon T-73	*lb.*	.285 /	.495
T-77	*lb.*	.45 /	.69
Indulins	*lb.*	.06 /	.08
Kreelons	*lb.*	.132 /	.155
Laurelton Oil	*lb.*	.18	
Leonil SA	*lb.*	.52 /	.65
Lomar PW	*lb.*	.18	
Marasperse CB	*lb.*	.1225/	.1425
N	*lb.*	.095 /	.105
Modicols	*lb.*	.17 /	.58
Nekal BA-75	*lb.*	.395 /	.54
BX-76	*lb.*	.63 /	.75
Orzan A	*lb.*	.0325	
S	*lb.*	.0425	
Pluronics	*lb.*	.335 /	.40
Polyfons	*lb.*	.08 /	.09
Sorapon SF-78	*lb.*	.28 /	.40
Tergitol NPX	*lb.*	.275 /	.3074
TMN	*lb.*	.2875/	.32
7	*lb.*	.4125/	.44
Trenamine W-30	*lb.*	.15	
W-40	*lb.*	.60 /	.75
Triton R-100	*lb.*	.12 /	.25
X-100, -102, -114	*lb.*	.255 /	.36
Dispersions			
Agebest 1293-22	*lb.*	1.90 /	2.00
AgeRite Alba	*lb.*	3.00	
Powder, Resin D	*lb.*	.80	
White	*lb.*	1.80	
Altax	*lb.*	.75	
Shield Nos. 2, 6	*lb.*	.08	
3	*lb.*	.095	
4-35	*lb.*	.09	
5	*lb.*	.093	
7-F, 8	*lb.*	.165	
55	*lb.*	.18	
Iron Oxide, 60%	*lb.*	.40	
L.S.W.	*lb.*	$1.50	
No. 305 Liquizinc	*lb.*	.30 /	$0.35
P-33	*lb.*	.35	
Rotax	*lb.*	.75	
Sulfur	*lb.*	.12 /	.30
No. 2	*lb.*	.14 /	.16
Telloy	*lb.*	3.00	
Tuads, Methyl	*lb.*	1.60	
Vulcacure NB	*lb.*	.45	
NS	*lb.*	.75 /	1.05
ZB, ZE, ZM	*lb.*	.85 /	.89
Vulcanizing, C group	*lb.*	.40 /	1.30
G group	*lb.*	.45 /	.90
N group	*lb.*	.40 /	1.00
Vulcafoams	*lb.*	.40 /	.70
Vulcanols	*lb.*	.75 /	.80
Zetax	*lb.*	.75	
Zimates, Butyl	*lb.*	1.30	
Ethyl, Methyl	*lb.*	1.35	
Zinc oxide	*lb.*	.40	
Emulsions			
AgeRite Stalite	*lb.*	.75	
Borden Arcco A-25, A-26, 716-30	*lb.*	.18 /	.19
555-40-R	*lb.*	.185 /	.205
620-32B	*lb.*	.20 /	.21
716-35	*lb.*	.17 /	.18
1041-21	*lb.*	.165 /	.175
Habuco Resin Nos. 502, 515, 523	*lb.*	.195 /	.20
503	*lb.*	.22 /	.225
504, 526	*lb.*	.19 /	.195
517	*lb.*	.175 /	.18
524	*lb.*	.155 /	.16
Resin A-2	*lb.*	.16 /	.25
P-370	*lb.*	.175 /	.25
X-210	*lb.*	.12 /	.22
Freeze-Stabilizer 322	*lb.*	.40	
12116C	*lb.*	.52	
Igepon T-43	*lb.*	.145 /	.35
T-51	*lb.*	.125 /	.285
-73	*lb.*	.285 /	.495
Ludox	*lb.*	.1675/	.195
Marmix	*lb.*	.41 /	.48
Merac	*lb.*	.75 /	1.05
Micronex, colloidal	*lb.*	.06 /	.072
Monsanto Blue 4685 WD	*lb.*	1.60	
Green 4884 WD	*lb.*	1.80	
Red 127	*lb.*	1.25	
OPD 101	*lb.*	.16 /	.26
Picco Latex Plasticizer A-12	*lb.*	.069 /	.096
Pliolite Latex 150, 190	*lb.*	.32 /	.41
170	*lb.*	.37 /	.46
Polyvinyl methyl ether	*lb.*	.25 /	.45
Resin V	*lb.*	.13	
Roelgel 100C	*lb.*	.46	
Santomerse D	*lb.*	.44 /	.65
S	*lb.*	.13 /	.25
Sellogen Gel	*lb.*	.1275	
Sequestrene AA	*lb.*	.905 /	.975
30A	*lb.*	.245 /	.265
ST	*lb.*	.585 /	.615
Setsit #5	*lb.*	.75 /	1.05
Stablex A	*lb.*	.80 /	1.10
B, G	*lb.*	.50 /	.95
K	*lb.*	.27 /	.35
Stablex P	*lb.*	.35 /	.50
T	*lb.*	.14 /	.22
Surfactol 13	*lb.*	.345 /	.36
Webnix	*lb.*	1.50 /	2.50

Mold Lubricants

Acintol D	*lb.*	.06 /	.075
A-C Polyethylene	*lb.*	.30 /	.37
Alipal CO-433	*lb.*	.25 /	.45
CO-436	*lb.*	.22 /	.41
Aquarex Compounds	*lb.*	.21 /	.94
Carbowax 200, 300, 400	*lb.*	.22 /	.25
1500	*lb.*	.255 /	.2825
4000	*lb.*	.31 /	.32
6000	*lb.*	.35 /	.36
Castorwax	*lb.*	.3375/	.3575
Colite Concentrate	*gal.*	.90 /	1.15
D-Tak Dip #10	*gal.*	1.50	
DC Mold Release Fluid	*lb.*	3.14 /	4.75
Compound 4, 7	*lb.*	5.13 /	6.50
Emulsion 7	*lb.*	1.59 /	2.07
8, 35, 35A, 35B, 36	*lb.*	1.22 /	1.76
200 Fluid	*lb.*	3.14 /	4.75
ELA	*lb.*	.82	
FT Wax 200	*lb.*	.265 /	.42
300	*lb.*	.295 /	.45
Glycerized Liquid Lubricant, concentrated	*gal.*	1.25 /	1.63
Igepals	*lb.*	.2875	.74
Igepon AP-78	*lb.*	.44 /	.68
T-43	*lb.*	.145 /	.35
-51	*lb.*	.125 /	.285
-73	*lb.*	.285 /	.495
Lubrex	*lb.*	.27 /	.32
Lubri-Flo	*gal.*	10.00 /	12.05
Lustermold	*lb.*	.41	
L-41 Diethyl Silicone Oil	*lb.*	3.50	
Mold Paste	*lb.*	.25	
Monopole Oil	*lb.*	.16	
Monten Wax	*lb.*	.57	
Para Lube	*lb.*	.046 /	.048
Paraflint RG and RGU Synthetic Wax	*lb.*	.15 /	.22
Plaskon 8406, 8407	*lb.*	.30 /	.37
8416, 8417	*lb.*	.35 /	.42
8429	*lb.*	.40 /	.47
Pluronics	*lb.*	.335 /	.44
Poly-Brite PE-200	*lb.*	.28 /	.42
600	*lb.*	.42 /	.58
Poly-Cone 125X	*lb.*	1.22 /	1.40
1000	*lb.*	.94 /	1.06
Polyglycol E series	*lb.*	.29 /	.42

MACHINERY & SUPPLIES FOR SALE (Con't.)

FOR SALE: ALL IN STOCK! 6—465-GAL. STAINLESS-STEEL Reactors, 150# C.W.P., 165# jkt. 3—4' x 84" vert. vulcanizers, quick-opening doors, ASME 120#. 1—Farrel 3400 HP Horiz. reducer. 1—6" x 13" new cab. mill. 2—50" mills. 2—40 HP Sprout-Waldron rotary-knife cutters. 1—6 oz. Watson-Stillman & 1—6 oz. Lester injection molding machine. Sigma blade mixers—2½, 5, 10, 35, 50, 60, 75, 100, 150 gal.—stainless steel & steel. Tablet or preform press—Stokes "R," "T," "DD-2," "RD-4," Kux rotary 21, 25 punch. SEND FOR COMPLETE INVENTORY BULLETIN! PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila. 22, Pa.

HYDRAULIC PRESSES, 800-TON MULTI-OPENING, 26" x 38" platens. 500-ton Southwark downstroke 32" x 36". 3 — 300-ton upstroke, 22" x 35". 300-ton multi-opening 40" x 40" platens. 2 — 200-ton Farrel, 30" x 30". 200-ton 20" x 80" platens. 150-ton 24" x 24" platens. 140-ton 36" x 36" platens. 3 — 115-ton Dunning & Boshert, 20" x 24". 100- to 300-ton Stokes Transfer Molding Presses. New & Used Lab. 6" x 13", 6" x 16", and 8" x 16" Mills and Calenders, and sizes up to 84". Baker-Perkins & Day Heavy-Duty Jack. Mixers up to 150 gals. Hydraulic Pumps & Accumulators, Rotary Cutters. Single Punch & Rotary Pre-form Machines. Banbury Mixers, Crushers, Churns, Bale Cutters, Gas Boilers, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107 — 8th Street, Brooklyn 15, N. Y. STerling 8-1944.

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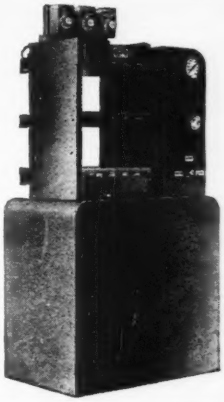

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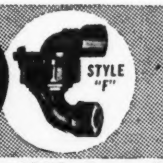

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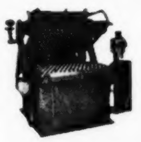

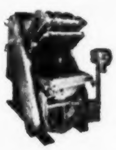

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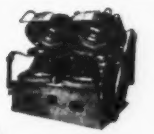

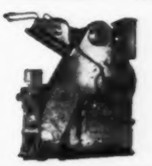

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UNITED

UNITED RUBBER MACHINERY EXCHANGE

183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

SA-1, -2, -3	gal.	$2.25 /	$3.00
Rubber Glo	gal.	.94 /	.97
SM-33, -55, -61, -62	lb.	1.22 /	1.76
Soap, Hawkeye	lb.	1.35 /	1.45
Purity	lb.	.155 /	.165
Sodium stearate	lb.	.40	
Stoner's 700 series	gal.	1.20 /	1.25
800 series	gal.	1.26 /	1.70
900 series	gal.	1.55 /	2.55
A Series	gal.	1.80 /	4.50
Ucon 50-HB Series	lb.	.25 /	.375
Ulco	lb.	.12 /	.23
Vanfre	gal.	2.50 /	3.00

Odorants

Alamasks	lb.	.75 /	6.50
Coumarin	lb.	2.95 /	3.55
Curodex 19	lb.	4.75 /	5.05
188	lb.	5.75	
198	lb.	5.75	
Ethavan	lb.	6.75 /	7.35
Latex Perfume #7	lb.	4.00	
Neutroleum Gamma	lb.	3.60	
Rubber Perfume #10	ll.	2.60	
Vanillin, Monsanto	lb.	3.00 /	3.15

Plasticizers and Softeners

Acintol R	lb.	.065 /	.07
Adipol 2EH, 10A	lb.	.40 /	.435
BCA	lb.	.43 /	.455
ODY	lb.	.43 /	.465
Admex 710	lb.	.325	
711	lb.	.345	
744	lb.	.40	
Aro Lene #1980	lb.	.10 /	.12
Baker AA Oil	lb.	.195 /	.24
Crystal O Oil	lb.	.21 /	.255
Processed oils	lb.	.215 /	.235
Bardol, 639	lb.	.215 /	.235
B	lb.	.0625/	.065
Benzoflex 2-45	lb.	.26 /	.29
9-88	lb.	.27 /	.30
Bondogen	lb.	.55 /	.60
BRC 20	lb.	.15 /	.175
22	lb.	.025 /	.0275
30	lb.	.0125/	.021
521	lb.	.019 /	.02
BRH 2	lb.	.0213/	.0351
BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
BRV	lb.	.0475/	.0565
Bunarex Liquid	lb.	.0425/	.0555
Resins	lb.	.065 /	.1225
Bunnatol G, S	lb.	.40 /	.505
Butac	lb.	.125 /	.135
Butyl stearate, comml.	lb.	.255	
Binney & Smith	lb.	.23 /	.26
Hardesty	lb.	.23 /	.26
Ohio-Apex	lb.	.245 /	.255
Cabflex HS-10	lb.	.44 /	.47
G. P.	lb.	.0125/	.02
R-100	lb.	.045 /	.0525
TT	lb.	.017 /	.0245
Califlux G. P.	lb.	.015 /	.0225
R-100	lb.	.0475/	.0575
T-T	lb.	.019 /	.0295
510, 550	lb.	.0275/	.0375
Capryl alcohol, comml.	lb.	.195 /	.235
Binney & Smith	lb.	.18 /	.28
Hardesty	lb.	.18 /	.28
Chlorowax 40	lb.	.1625/	.1825
70	lb.	.185 /	.245
-S	lb.	.21 /	.27
Circo light	gal.	.17	
Circosol-2XH	gal.	.185	
Contogums	lb.	.0875/	.111
Cumar Resins	lb.	.065 /	.17
DBM (dibutyl-m-cresol)			
Darax	lb.	.32 /	.3475
DBP (dibutyl phthalate),			
comml.	lb.	.30 /	.133
Darex	lb.	.30 /	.33
Eastman	lb.	.30 /	.33
Harwick Std. Chem. Co.	lb.	.325 /	.385
Hatco	lb.	.30 /	.33
Monsanto	lb.	.30 /	.33
Naugatuck	lb.	.30 /	.33
Ohio-Apex	lb.	.30 /	.335
PX-104	lb.	.30 /	.33
Rubber Corp. of America	lb.	.30 /	.44
Sherwin-Williams	lb.	.30 /	.33
DBS (dibutylsebacate)			
comml.	lb.	.66 /	.69
Hatco	lb.	.66 /	.685
Monoplex	lb.	.66 /	.675
Naugatuck	lb.	.665 /	.69
PX-404	lb.	.665 /	.69
DCP (dicaprylphthalate),			
comml.	lb.	.295 /	.325
Hatco	lb.	.295 /	.325
Monoplex	lb.	.30 /	.315
DDA (didecyladipate)			
Cabflex	lb.	.425 /	.455
Good-rite GP-236	lb.	.40 /	.55
DDP (didecylphthalate)			
Cabflex	lb.	.305 /	.335
Good-rite GP-266	lb.	.295 /	.45
Hatco	lb.	.305 /	.435
Defoamer X-3	lb.	.355	
DIBA (diisobutyladipate)			
Cabflex	lb.	.4325 /	.4625
Darex	lb.	.4325/	.4625
Eastman	lb.	.41 /	.44
Ohio-Apex	lb.	.41 /	.445
DIDA (diisodecyladipate)			
Monsanto	lb.	.425 /	.455
DIDP (diisodecylphthalate)			
Darex	lb.	$0.32 /	$0.35
Monsanto	lb.	.305 /	.335
Ohio-Apex	lb.	.295 /	.325
PX-120	lb.	.305 /	.335
Dielex B	lb.	.06	
Diethylene glycol, comml.	lb.	.1525/	.1825
Wyandotte	lb.	.15 /	.165
Dinopol IDO	lb.	.285 /	.32
DIOA (diisooctyladipate)			
Cabflex	lb.	.425 /	.455
Naugatuck	lb.	.435 /	.465
PX-208	lb.	.425 /	.455
Rubber Corp. of America	lb.	.425 /	.56
DIOP (diisooctylphthalate),			
comml.	lb.	.305 /	.335
Cabflex	lb.	.305 /	.335
Darex	lb.	.32 /	.35
Eastman	lb.	.305 /	.335
Hatco	lb.	.305 /	.335
Monsanto	lb.	.305 /	.335
Naugatuck	lb.	.305 /	.335
Ohio-Apex	lb.	.28 /	.315
PX-108	lb.	.305 /	.335
Rubber Corp. of America	lb.	.305 /	.45
Sherwin-Williams	lb.	.32 /	.34
DIOS (diisooctylsebacate),			
comml.	lb.	.61 /	.64
Rubber Corp. of America	lb.	.61 /	.84
DIOZ (diisooctylazelate)			
Cabflex	lb.	.48 /	.51
Dipolymer Oil	gal.	.33 /	.38
Dispersing Oil No. 10	lb.	.06 /	.0625
DNODP (di-n-octyl-n-decyl phthalate), Monsanto	lb.	.345 /	.375
DOA (dioctyladipate),			
comml.	lb.	.425 /	.455
Cabflex	lb.	.425 /	.455
Eastman	lb.	.40 /	.43
Good-rite GP-233	lb.	.40 /	.55
Hatco	lb.	.435 /	.465
Monsanto	lb.	.425 /	.455
Naugatuck	lb.	.435 /	.465
PX-238	lb.	.425 /	.455
Rubber Corp. of America	lb.	.425 /	.56
DOP (dioctylphthalate),			
comml.	lb.	.305 /	.335
Cabflex	lb.	.305 /	.335
Darex	lb.	.32 /	.35
Eastman	lb.	.305 /	.335
Good-rite GP-261	lb.	.285 /	.44
Hatco	lb.	.305 /	.335
Monsanto	lb.	.305 /	.335
Naugatuck	lb.	.305 /	.335
Ohio-Apex	lb.	.28 /	.315
Polycizer 162	lb.	.28 /	.435
PX-138	lb.	.305 /	.335
Rubber Corp. of America	lb.	.305 /	.45
Sherwin-Williams	lb.	.305 /	.335
DOS (dioctylsebacate),			
comml.	lb.	.61 /	.64
Eastman	lb.	.61 /	.64
Hatco	lb.	.61 /	.635
Monoplex	lb.	.61 /	.635
Naugatuck	lb.	.615 /	.64
PX-438	lb.	.615 /	.64
Rubber Corp. of America	lb.	.61 /	.84
Drapex 3.2	lb.	.40 /	.54
Dutch Boy NL-A10 (DBP)	lb.	.30 /	.33
-A20 (DOP), A30 (DIOP)	lb.	.305 /	.335
-A54	lb.	.295 /	.325
-C20 (DOS)	lb.	.61 /	.63
-F21	lb.	.395 /	.425
-F31	lb.	.44 /	.47
-F41	lb.	.48 /	.51
Dutrex 6	lb.	.025 /	.035
Dymerex Resin	lb.	.135 /	.1475
Emulphor EL-719	lb.	.52 /	.73
Endor	lb.	.65	
Ethox	lb.	.43 /	.455
Ethylene glycol, comml.	lb.	.135 /	.165
Wyandotte	lb.	.1325/	.1425
Flexol 3 GH	lb.	.44 /	.46
3 GO	lb.	.53 /	.55
4 GO	lb.	.325 /	.355
10-A	lb.	.425 /	.455
426	lb.	.27 /	.30
810, 810X, 10-10, 10-10X	lb.	.305 /	.335
TOF, A-26	lb.	.435 /	.465
Flexricin P-4	lb.	.3475/	.3625
P-6	lb.	.415 /	.43
P-8	lb.	.3475/	.3625
PG-16	lb.	.335 /	.35
Fortex	lb.	.125 /	.145
G. B. Asphaltic Flux	gal.	.097 /	.177
Naphthenic Neutrals	gal.	.125 /	.215
Process oil, light	lb.	.0275/	.0375
Medium	lb.	.0375/	.0475
Galex W-100	lb.	.155 /	.18
W-100 D	lb.	.1525/	.1775
Gilsowax B	lb.	.0975/	.11
Harchemex	lb.	.24 /	.345
Harflex	lb.	1.25 /	1.335
40	lb.	.64 /	.725
50, 80, 300	lb.	.58 /	.665
60	lb.	.62 /	.705
90	lb.	.88 /	.965
120, 150	lb.	.305 /	.395
140, 160	lb.	.30 /	.33
180	lb.	.295 /	.38
220, 250	lb.	.425 /	.515
260	lb.	.42 /	.45
280	lb.	.42 /	.51
500	lb.	.315 /	.41
HB-20	lb.	.15 /	.17
-40	lb.	.19 /	.21
Heavy Resin Oil	lb.	.0225/	.0375
HSC-13	lb.	.25 /	.32
-39	lb.	.22 /	.29
Hycar 1312	lb.	$0.60	
Indonex	gal.	.11 /	$0.19
Kapsol	lb.	.33 /	.355
Kenflex A, L	lb.	.26 /	.27
B	lb.	.23 /	.24
N	lb.	.18 /	.19
Kessoflex 103	lb.	.405	
105	lb.	.3325	
106	lb.	.38	
107	lb.	.525	
110	lb.	.24	
111	lb.	.28	
KP-23	lb.	.29 /	.325
-90	lb.	.40 /	.435
-140	lb.	.46 /	.485
-201	lb.	.58 /	.59
-220	lb.	.32 /	.355
-555	lb.	.565 /	.57
Kronisol	lb.	.33 /	.365
Kronitex AA, I, K-3, Mx	lb.	.325 /	.36
LX-685, -125, -135	lb.	.125 /	.135
Marvinol plasticizers	lb.	.28 /	.8825
Methox	lb.	.385 /	.41
Monoplex S-38	lb.	.215 /	.24
S-71	lb.	.45 /	.475
Morflex	lb.	.25 /	.65
Natac	lb.	.12 /	.13
Neoprene Peptizer P-12	lb.	1.05	
Nevillac	lb.	.31 /	.85
Neville R Resins	lb.	.145 /	.205
Nevinol	lb.	.24	
No. 1-D heavy oil	lb.	.065	
ODA (octyldecyladipate)			
Cabflex	lb.	.425 /	.455
Good-rite GP-235	lb.	.40 /	.55
ODP (octyldecylphthalate)			
Cabflex	lb.	.305 /	.335
Good-rite GP-265	lb.	.29 /	.445
Hatco	lb.	.305 /	.335
Rubber Corp. of America	lb.	.305 /	.45
Ohopex Q-10	lb.	.295 /	.33
R-9	lb.	.3525/	.3775
Orthonitro benzophenol,			
comml.	lb.	.13 /	.15
Monsanto	lb.	.13 /	.15
Palmalene	lb.	.15	
Panaflex BN-1	lb.	.185 /	.225
Para Flux, regular	gal.	.10 /	.2125
No. 2016	gal.	.165 /	.24
2332	gal.	.11	
4205	lb.	.1075/	.2125
Para Lube	lb.	.046 /	.048
Resins	lb.	.04 /	.045
Paradene Resins	lb.	.07 /	.08
Paraplex 5-B	lb.	.29 /	.3475
Al-111	lb.	.32 /	.3275
G-25	lb.	.76 /	.77
-40	lb.	.4825/	.51
-50	lb.	.39 /	.4175
-53	lb.	.4325/	.46
-60	lb.	.325 /	.35
-62	lb.	.345 /	.37
RG-7	lb.	.33 /	.335
-8	lb.	.505 /	.5125
-10	lb.	.52 /	.5275
Pepton 22	lb.	.81 /	.84
65	lb.	1.20 /	1.23
65-B	lb.	.81 /	.84
Philrich 5	gal.	.11	
Picco Resins	lb.	.135 /	.195
480 Oilproof Series	lb.	.18 /	.23
Aromatic Plasticizers	lb.	.05 /	.065
Liquid Resin D-165 (Y)	lb.	.06 /	.075
(Z-3)	lb.	.07 /	.085
(Z-6)	lb.	.08 /	.095
S. O. S.	gal.	.29 /	.34
Piccocizers	lb.	.04 /	.055
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.205 /	.245
Piccopale Resins	lb.	.12 /	.135
Piccovars	lb.	.165 /	.20
Piccovol	lb.	.025 /	.038
Pictar	gal.	.25 /	.30
Pigmentar	lb.	.046 /	.0745
Pigmentaroil	lb.	.046 /	.0745
Pine Tar, Sunny South	lb.	.046 /	.0801
Oil, Sunny South	lb.	.046 /	.0801
Pitch, Burgundy, Sunny South	lb.	.1030/	.1085
Plasticizers			
42	lb.	.34 /	.40
B	lb.	.35 /	.45
DP-520	lb.	.435 /	.455
MP	lb.	.035 /	.0755
MT-511	lb.	.6925/	.7425
ODN	lb.	.35 /	.475
SC	lb.	.40 /	.515
Plastoflex #3	lb.	.52 /	.57
#520	lb.	.36 /	.435
DBE	lb.	.50 /	.55
MGB	lb.	.29 /	.37
SP-2	lb.	.43 /	.48
VS	lb.	.3575/	.3975
Plastogen	lb.	.0775/	.08
Plastone	lb.	.25 /	.32
Polycin 470	lb.	.325 /	.34
Polycizers	lb.	.28 /	.55
162	lb.	.285 /	.44
Polymel C-128	lb.	.1775/	.1875
D	lb.	.225 /	.235
D-TAC	lb.	.1975/	.215
DX, C-130	lb.	.1375/	.1475
Poly-Sperse AP-2	lb.	.23 /	.295
AP-300	lb.	.26 /	.325
LC-20	lb.	.26 /	.325
PT67 Light Pine Oil	gal.	.60	
101 Pine Tar Oil	lb.	.046 /	.0634
Pine Tars	lb.	.046 /	.0634
Reogen	lb.	.1325/	.135

MACHINERY & SUPPLIES FOR SALE (Con't.)

FOR SALE—BANBURY #9 INTERNAL RUBBER MIXER—STELlite tipped rotors, spray-type cooling, chrome-plated sliding door, air-operated hopper door, #4 Birmingham reducer unit. Also available for immediate delivery #3 Banbury Mixer. SHERMAN RUBBER MACHINERY COMPANY, Division of Botwinik Brothers of Mass., Inc., 22 Sherman St., Box 831, Worcester, Mass.

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COMPLETE EQUIPMENT FOR
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30-TON DAILY CAPACITY
CRACKERS — SHAKERS — DEVULCANIZERS
STRAINER — REFINERS, ETC.
CAN BE INSPECTED IN OPERATION
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Guaranteed
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We have for Sale No. 3 and No. 9 Banbury Mixers.
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DIVISION OF BOTWINIK BROTHERS OF MASS., INC.
SHERMAN RUBBER MACHINERY CO.

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OF "V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, expanding mandrels, automatic cutting, skiving, flipping and roll drive wrapping machines.
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TECHNICAL DATA ON REQUEST
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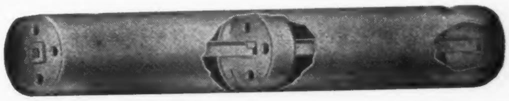

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We do milling and compounding of all types—black or color—master batches
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We are one of the foremost specialists in supplying used, reconditioned, and new machinery for the Rubber and Plastic industries only. NEW—Laboratory mills, hydraulic presses, extruders, bale cutters, and vulcanizers. We are interested in purchasing your surplus machinery or complete plant.

Resin C pitch	lb.	$0.0225/	$0.031
R6-3	lb.	.38 /	.40
Resinex 10, 25, 50, 110	lb.	.04 /	.045
70	lb.	.0325/	.0375
85, 100	lb.	.035 /	.04
115	lb.	.0375/	.0425
L-2, L-3, L-4, L-5	lb.	.0225/	.03
Rosin Oil, Sunny South	gal.	.58 /	.875
RPA No. 2	lb.	.82	
3	lb.	.48	
Conc.	lb.	.85	
5	lb.	.68	
6	lb.	1.62	
RSN Flux	gal.	.10 /	.91
Rubber Oil B-5	lb.	.0225/	.0355
Rubberol	lb.	.18 /	.2725
Santicizer 1-H	lb.	.50 /	.51
3	lb.	.46 /	.47
8	lb.	.43 /	.44
9	lb.	.39 /	.42
140	lb.	.325 /	.36
141	lb.	.34 /	.37
160	lb.	.25 /	.28
601	lb.	.325	
602	lb.	.305	
B-16	lb.	.4875/	.4975
E-15	lb.	.5075/	.5375
Santocizer	lb.	.4275/	.4575
Sebacic acid, purified,			
comml.	lb.	.59 /	.65
Binney & Smith	lb.	.64 /	.76
Hardesty	lb.	.64 /	.76
C. P.- Binney & Smith	lb.	.72 /	.84
Hardesty	lb.	.72 /	.84
Sherolatum Petroleum	lb.	.05 /	.10
Softener #20	gal.	.10 /	.20
Special Rubber Resin 100	lb.	.1675/	.2175
Staflex AX	lb.	.43	
DBES	lb.	.61 /	.635
Syn-Tac	gal.	.33 /	.35
Synthol	lb.	.17 /	.2625
Thiokol TP-90B	lb.	.59	
-95	lb.	.65	
Tricresyl phosphate, comml	lb.	.33 /	.36
Cabflex	lb.	.345 /	.375
Monsanto	lb.	.325 /	.36
Naugatuck	lb.	.33 /	.36
PX-917	lb.	.33 /	.36
Triphenyl phosphate,			
comml.	lb.	.39 /	.40
Monsanto	lb.	.39 /	.40
Turgum S	lb.	.1075/	.1175
Tysonite	lb.	.24 /	.2475
United	gal.	.69 /	1.20
X-1 Resinous Oil	lb.	.0225/	.0325

Reclaiming Oils

Acintol C, P	lb.	.02 /	.03
Bardol, 639	lb.	.0275/	.0375
B	lb.	.0625/	.065
BRH 2	lb.	.0213/	.0351
BRT 3	lb.	.018 /	.0265
4	lb.	.025 /	.026
7	lb.	.03 /	.031
BRV	lb.	.0475/	.0565
Burco-RA	lb.	.053 /	.0805
BWH-1	lb.	.16 /	.18
Dipolymer Oil	gal.	.33 /	.43
Dispersing Oil No. 10	lb.	.06 /	.0625
G. B. Oils	gal.	.115 /	.275
Heavy Resin Oil	lb.	.0225/	.0375
LX-572	gal.	.27 /	.32
-759	gal.	.1375	
-777, -809, -859	gal.	.23 /	.33
-869	gal.	.33 /	.43
-871	gal.	.34 /	.44
No. 3186	gal.	.28 /	.295
Picco 6535	gal.	.25 /	.30
C-33	gal.	.215 /	.315
-42	gal.	.23 /	.33
D-4	gal.	.27 /	.37
E-5	gal.	.25 /	.35
Q-Oil	gal.	.286 /	.36
PT 67	gal.	.60	
101 Pine Tar Oil	lb.	.0427/	.061
150 Pine Solvent	gal.	.44	
Reclaiming Oil #3186	gal.	.28 /	.385
-G	gal.	.25 /	.365
4039-M	gal.	.3275/	.3975
-Y	gal.	.30 /	.37
RR-10	lb.	.37	
S. R. O.	lb.	.015 /	.0225
X-1 Resinous Oil	lb.	.0225/	.0325

Reinforcers, Other Than Carbon Black

Angelo Shellacs	lb.	.485 /	.7325
Borden, Chem. Div.			
Arcco 978-42B	lb.	.18 /	.19
1073-18B	lb.	.135 /	.145
1294-36B	lb.	.115 /	.125
1301-12B	lb.	.15 /	.16
BRC 20	lb.	.15 /	.175
22	lb.	.025 /	.0275
30	lb.	.0125/	.021
521	lb.	.019 /	.02
Bunarex Resins	lb.	.065 /	.1225
Cab-o-sil	lb.	.68 /	.75
Calcene NC	ton	72.50 /	92.50
TM	ton	75.00 /	95.00
Calco S. A.	lb.	.85 /	.88
Clays			
Aiken	ton	14.00	
Aluminum Flake	ton	22.25 /	60.00
Buca	ton	45.00	
Burgess Iceberg	ton	50.00 /	80.00
Icecap K	ton	65.00 /	90.00
Pigment #20	ton	35.00 /	60.00
#30	ton	37.00 /	60.00
Catalpo	ton	$35.00	
Crown	ton	14.00 /	$33.00
Dixie	ton	14.00	
Franklin	ton	13.50 /	35.25
L. G. B.	ton	17.00	
Paragon	ton	13.50 /	33.00
Pigment No. 33	ton	37.00	
Recco	ton	14.00	
Suprex	ton	14.00 /	33.50
Swanee	ton	12.50	
Whitetex	ton	50.00	
Windsor	ton	14.00 /	30.00
Witco No. 1	ton	14.00 /	30.00
No. 2	ton	13.50 /	30.00
Clearcarb	lb.	.1175/	.1255
Cumar Resins	lb.	.065 /	.17
Darex Resins	lb.	.42 /	.49
DC Silica	lb.	1.45 /	1.65
Diatomaceous silica	ton	32.00 /	48.00
Good-rite 2007		.36 /	.38
2057		.30 /	.31
K Series Polymers	lb.	.15 /	.37
Hi-Sil 101	lb.	.14 /	.155
233	lb.	.08 /	.095
X303	lb.	.40 /	.45
Hycar 2001	lb.	.55	
2007	lb.	.39	
Indulins	lb.	.06 /	.08
Kralac A-EP	lb.	.43 /	.54
Laminar	ton	30.00	
Magnesium carbonate,			
Marinco CL	lb.	.105 /	.135
Marbon Resins	lb.	.36 /	.43
Multifex MM	ton	110.00 /	125.00
Super	ton	160.00 /	175.00
Neville Resins			
465	lb.	.075 /	.08
LX-509	lb.	.33 /	.35
Nebony	lb.	.045 /	.05
Paradene	lb.	.07 /	.08
R	lb.	.145 /	.205
Para Resins 2457, 2718	lb.	.04 /	.4575
Parapol S-Polymers	lb.	.44	
Picco Resins	lb.	.13 /	.225
Piccolyte Resins	lb.	.205 /	.275
Piccoumaron Resins	lb.	.07 /	.19
Piccovars	lb.	.145 /	.20
Pliolite NR types	lb.	.98 /	1.33
S-3	lb.	.42 /	.49
S-6	lb.	.36 /	.43
-6B	lb.	.36 /	.43
Plio-Tuf G85C	lb.	.52 /	.59
Purecal M	ton	56.75 /	71.75
SC, T	ton	110.00 /	125.00
U	ton	120.00 /	135.00
R-B-H 510	lb.	.15 /	.22
Resinex	lb.	.0225/	.1025
Rubber Resin LM-4	lb.	.28 /	.35
Silene EF	ton	120.00 /	140.00
Silvacons	ton	55.00 /	85.00
Transphalt	lb.	.0225 /	.0525
Witcarb R	ton	105.00 /	120.00
-12	ton	45.00 /	66.00
Zeolex 23	ton	120.00 /	140.00
Zinc oxide, commercial†	lb.	.135 /	.1775

Retarders

Benzoic acid TBAO-2	lb.	.44	
E-S-E-N	lb.	.37 /	.39
Good-rite Vultrol	lb.	.62 /	.66
R-17 Resin	lb.	.1075/	.36
Retarder ASA	lb.	.57	
J	lb.	.62 /	.64
PD	lb.	.37 /	.39
W	lb.	.42	
Retardex	lb.	.47 /	.50
Thionex	lb.	1.14	
Wiltrol P	lb.	.37 /	.39

Solvents

Bondogen	lb.	.55 /	.60
Butyrolactone	lb.	.60 /	.65
Cosol #1	gal.	.37 /	.43
#2	gal.	.42 /	.48
Dichloro Pentanes	lb.	.04 /	.07
Dipentene DD, Sunny			
South	gal.	.40 /	.62
Ethylene dichloride, comml.	lb.	.09 /	.122
Hi-Flash 2-50-W	gal.	.41	
Pale yellow	gal.	.39	
LX-572	gal.	.27 /	.32
-748	gal.	.16 /	.23
Methyl-2-pyrrolidone	lb.	.75 /	.80
Neville Nos. 100, 104	gal.	.52 /	.60
106	gal.	.38 /	.46
Nevsolv H, 200	gal.	.19 /	.29
HF, T, 30	gal.	.24 /	.34
Penetrell	gal.	.40 /	.62
Picco Hi-Solv Solvents	gal.	.16 /	.48
Pine Oil DD, Sunny South	lb.	.1225/	.1425
PT 150 Pine Solvent	gal.	.44	
Skellysolve-B	gal.	.17	
-H	gal.	.148	
-R, -V	gal.	.139	
-C	gal.	.162	
Stauffer Carbon Disulfide	lb.	.0525/	.085
Tetrachloride	lb.	.0825/	.475

Tackifiers

Acintol R	lb.	.065 /	.07
Bardol, 639	lb.	.0275/	.0375
Borden, Arcco			
A25, A26, 716-30	lb.	.18 /	.19
555-40R	lb.	.185 /	.205
620-32B	lb.	.20 /	.21
716-35	lb.	.17 /	.18
1041-21	lb.	.165 /	.175
BRH 2	lb.	$0.0213/	$0.0351
Bunarex Resins	lb.	.065 /	.1225
Chlorowax 70	lb.	.18 /	.24
Contogums	lb.	.0875/	.11
Cumar Resins	lb.	.065 /	.17
Galex W-100	lb.	.155 /	.17
W-100D	lb.	.1525/	.1625
Indopol H-35	gal.	.65 /	.81
H-50	gal.	.70 /	.86
-100	gal.	.85 /	1.05
-300	gal.	1.00 /	1.21
L-10	gal.	.40 /	.56
-50	gal.	.45 /	.61
-100	gal.	.55 /	.71
Kenflex resins	lb.	.18 /	.27
Koresin	lb.	.90 /	1.10
Natac	lb.	.12 /	.13
Nevindene	lb.	.15 /	.18
Picco Resins	lb.	.13 /	.185
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.089 /	.13
Piccoumaron Resins	lb.	.07 /	.185
R-B-H 510	lb.	.15 /	.22
Roelflex 1118A	lb.	.39	
Synthetic 100	lb.	.41	
Synthol	lb.	.17 /	.2625
United	gal.	.69 /	1.20

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.60	
G-M-F #113, #117	lb.	.90	
HMDA-Carbamate	lb.	4.50 /	4.90
Ko-Blend I, S	lb.	.39	
Litharge (*See Accelerator-Activators, Inorganic*)			
Magnesium oxide	lb.	.2525/	.38
Maglite D, K	lb.	.2575/	.285
M	lb.	.2975/	.325
Red Lead (*See Accelerator-Activators, Inorganic*)			
Sulfasan R	lb.	1.50	
Sulfur flour, comml.	100 lbs.	2.55 /	3.30
Aero	100 lbs.	2.40 /	7.75
Crystex	lb.	.195 /	.23
Insoluble 60	lb.	.15 /	.155
Rubbermakers	100 lbs.	2.65 /	4.55
Stauffer	lb.	.0265/	.054
Telloy	lb.	2.50	
VA-7	lb.	.50 /	.60
Vandex	lb.	15.50	
Vultac No. 2	lb.	.47 /	.755
3	lb.	.51 /	.795
White lead silicate (*See Accelerator-Activators, Inorganic*)			

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National Petro-Chemicals To Build New Plants

A second plant to produce U.S.I. Petrothene polyethylene will be erected by National Petro-Chemicals Corp., New York, N. Y. The corporation is majority owned by U. S. Industrial Chemicals Co., division of National Distillers & Chemical Corp., and minority owned by Panhandle Eastern Pipeline Co.

The new plant, scheduled for operation by late 1958, will produce 75 million pounds a year of intermediate-density polyethylene resins. Annual capacity of the present Tuscola, Ill., plant is 100 million pounds.

A modification of the conventional high-pressure process, already proved in the Tuscola plant, will be used in the new installation. Resins produced there will be of an intermediate-density type, with properties somewhere between those of the original polyethylene and the new high-density resins produced by the so-called "low-pressure" processes.

The location of the new plant has not yet been chosen, but several Gulf Coast sites are being considered.

The vice president of National Petro-Chemicals, Robert E. Hulse, also announced that a new plastics compounding plant would be built near the Tuscola polyethylene plant where polyethylene will be compounded with colors, carbon black, and/or other additives. Initial capacity of the new compounding plant will be 25 million pounds a year, and it is scheduled for completion by mid-1958.

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